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ORIGINAL COMMUNICATIONS.

"EYE" IN SPORT.

BY

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Preface.

I TRUST that these few words on this subject will be of sufficient interest to justify their publication. I ask critics to remember that my only desire is to give a subject for interesting reflection, which has not hitherto been fully dealt with. I have a great deal more to say, but have no time to put it into shape for publication, and consequently I must be satisfied to leave many breaches in my fortifications which I could easily fill, if time were available. I believe that champions may arise who will agree with the truth of the views I enunciate, and who, I hope, will give them the support they need.

I have here to express my obligations to many friends who have given me the advantage of their views and criticisms, especially to Mr. James Braid, the Rev. A. C. Smith (hon secretary Oxford University Parks Club), and the Rev. H. Alington.

Anatomy.

To the proper understanding of this subject a few anatomical points are necessary. I shall put these as briefly as possible without going into minute details, which would only complicate the subject instead of making it clear. The eyes are situated in the head about two and a half inches apart, the exact distance varying in different individuals. They are attached to the brain by two long stalks, called the optic nerves. I might here observe that these nerves are not like those of other parts of the body, but that the sensitive part of the eyes and the optic nerves are really prolongations of the brain. It is interesting to bear this in mind when one speaks of the functions of the eyes, because the associations are so great that really they are functionally part of the brain rather than separate organs. In referring to the eyes themselves, it must be understood that their movement is controlled by muscles which are attached to the bone of the skull behind the eyes and come forward to be inserted into the eyeball a short distance from the margin of the cornea, the position of which is afterwards described. These muscles move the eye in four main directions, upwards, downwards, inwards, and outwards, and are called respectively the superior rectus, the inferior rectus, the internal rectus, and the external rectus, their names designating their positions. There are other muscles called the oblique, which assist in these movements, but it is not necessary to particularise their specific functions.

The eyeball itself may be described as a fibrous bag called the sclerotic, the front part of which is specialised into a transparent structure, which is called the cornea. Inside and behind this is the iris, the "colour" of the eye and forming the pupil, which has the power of altering in size under different conditions of light and other stimuli. Behind the iris is the lens, which, assisted by the cornea, is the chief agent in exactly focussing the rays of light and forming the image on the retina. The exact degree of curvature necessary for this purpose is controlled by a muscle called the ciliary muscle, which is situated around the lens and just behind the iris. The vitreous humour, a gelatinous substance which mainly fills the globe, lies behind the lens. Between the lens and the cornea is the aqueous humour, a watery secretion which is constantly being changed. Behind the iris; lining the sclerotic, is a layer called the choroid, mainly composed of blood vessels. The optic nerve pierces the sclerotic and choroid behind and spreads itself out into a membrane called the retina, which rests on the surface of the choroid and extends as far forward as the region of the ciliary muscle. This is the sensitive part, and it is this which receives the impressions of light and which passes them on to the brain by means of the optic nerve. It will be seen then that the eye resembles an ordinary photographic camera. The curved cornea and the lens represent the lens of the camera, the iris represents the diaphragm, the ciliary muscle represents the focusing screw, and the retina the sensitive plate.

Physiology.

It is well to begin with the retina, because all other parts of the eye are subsidiary to its function. The retina, as previously explained, is in reality a part of the brain. It receives the images of external objects, which are conveyed by the optic nerve to what is known as the centre for vision in the brain, or, more accurately, one of the centres of vision in the brain. These images are formed by the action of light. The retina, as has been pointed out, like a photographic plate, is sensitive to light. All parts of it are not equally sensitive. There is one part called the macula which is especially sensitive to light, and it is on this part that the brain depends for all detailed information. It is on this part, therefore, that the movements of the eye cause the image to fall, movements which constitute what is technically known as the act of looking. For instance, if a lighted match is placed near a baby's eye, in a position where its image will fall on some part of the retina, in other words, in what is technically known as its "field of vision," the infant will at once direct the eyes, by means of the eye muscles, in such a way that the image of the candle is found on the macula ; in other words, he "looks" at it. The retina, again, is not equally sensitive to coloured light ; now, by the action of a prism, light is divided up into its component colours, *i.e.*, the colours of the rainbow, and the periphery of the retina, will be found to be less sensitive to green, a little more so to red, and still more so to yellow and to blue, while the very central point of the macula is less sensitive to blue than to the other colours. This has a very important bearing, as will afterwards be seen. Now, it has been said that the eye has to be moved, so that the image falls on the functional centre of the retina, or macula, and it is for this purpose that the function of the muscles is required. It must be borne in mind that two eyes have to be dealt with, although it is only one image which is now under consideration. It should be noted that in the macular region, at any rate, are so-called "identical areas" which are associated together by a visual centre of the brain, so that images falling on those areas form one impression of the object in the judgment of the mind. If, however, the image does not fall exactly on these identical areas, two impressions of it (*i.e.*, double vision) results. It is the function, therefore, of the muscles of the two eyes to keep the eyes so directed that the images of the object which is under consideration fall on identical areas. It will be noted that certain muscles are associated together in their action. Thus, the internal rectus of one side is associated with the external rectus of the other side, and *vice versa*. Again, the superior and inferior recti are associated together. There is also another very important association, that of the internal recti with each other in the function of convergence; convergence, as the name implies, being the action of these muscles in keeping the eyes directed upon an object as it approaches the observer, or upon a fixed close object, such as is needed in reading. This action of the eyes in convergence is a very important one as regards the subject of this book, for it is by their action that the observer can tell how far distant is an object and the pace and direction of its approach.

It will be observed that, as the object approaches, so much more have the eyes to converge upon it, and it is this action of the muscles which gives such important information as to distance and movement which is technically known as "muscle-sense." The writer would here point out that he is speaking of the normal two-eyed person. When a person in adult life loses one eye, his judgment of distance is very much upset and he never acquires a very exact realisation. If, however, he is born with one eye only or in early life loses one eye, he develops a fairly accurate appreciation of distance in another way, which is to some extent developed by those who lose an eye in later life. The function alluded to is the action of the focussing muscles of the eye, and it is by the increasing degree of action of these muscles as an object approaches as well as by previous experience that the estimate of distance is formed in such cases. This, too, is of course muscle-sense.

Now, in addition to distance, appreciation of the size of objects is important, and this is learnt by the size of the retinal images and their relation to other known objects. The size of objects of the retinal images varies with conditions such as long sight, short sight and so on. A short sighted person has a larger degree of retinal impression of an object than a long sighted person has, although this is not appreciated by him because the conditions are always the same and he has no means of comparison. Its effect comes out in various ways in the use of the eyes. For instance, the frequent boast of an engraver that he can write the Lord's Prayer upon a sixpence probably means that the engraver is short sighted, for the sixpenny piece to him would resemble the size of a five shilling piece in comparison with the apparent size thereof to a normal sighted person. Judgment of objects on large areas, accordingly, is estimated by the relative comparison of known surrounding objects. Thus, on a desert at 1,000 yards it would be impossible to tell whether a boy or a man was approaching, whereas at the same distance where there were objects as gates, cows, and sheep, etc., an estimation could be made by a comparison of the relative heights. This relative appreciation is a very much greater factor in sight than is generally realised, and it will constantly recur in later chapters.

It should also be particularised how important in forming a judgment is the estimation of surrounding objects, not merely of the object at which one "looks," and whose image falls on the macula. This estimation is mainly subconscious. It is of the utmost importance to bear this in mind in dealing with "Eye" in Sport. The following illustration will make this point clear. A person in crossing a room to go out by the door, will generally direct his eyes to the handle of the door. Should there be a footstool in his path, without directly taking his eyes from the handle, the image of which falls on his macula, he will raise his feet to clear the footstool, although he may never directly turn his eyes to it, and only makes his estimation from the image on the periphery of his retina. Of course such acts are constantly recurring, and must ever be borne in mind.

In some cases the most important physiological attribute is what is known as muscle-sense. Muscle-sense represents the knowledge of the amount of muscular tension that is in use in any particular direction, and may be actual or intuitive ;* actual if, for instance, a definite weight is being lifted, intuitive if some well-known performance is being repeated, during the exercise of which or of some similar performance, the particular muscle-sense has been learned. Eyes in a state of rest, that is, when the action of the eye muscles is not controlling their direction, should be practically parallel with each other for distance. Sometimes this is not so, due to natural faulty position, or it may be found that some muscle from some cause acts more powerfully than others. This induces a condition known as heterophoria, which demands the extra action of one or other muscle to preserve single vision, if the functional condition of the eyes is otherwise sound. This error is well demonstrated by what is known as the rod test, a very simple means introduced by Dr. E. E. Maddox, of Bournemouth. There are very few who do not possess some small error, and in spasm of accommodation, mentioned hereafter, it will be found to be especially noticeable.

In directing the eyes, it is of great physiological importance to direct them in an appropriate plane. In most games with a ball, in batting or catching, this is of especial importance, and the reason thereof will appear when the writer deals with these actions. From the position of the head in human beings, the eyes are naturally used in the horizontal plane, the eyes being placed in that position, but if the head is turned on one side in the position which is very commonly used for cricket, the eyes are used more or less in the vertical plane, because the eyes are vertical, or more or less so, *i.e.*, one above the other. In dealing with the object looked at, such as a ball, the muscles which are employed have to be selected, grouped, and co-ordinated by experience in order to produce a certain effect. Each muscle is controlled by what is known as a centre in the brain, and the grouping and co-ordinating —in other words, the extent and time of stimulation—is controlled by higher brain centres, which are in their turn controlled by higher volitional centres. These volitional centres are again excited into action by the combined effect of other brain centres. This can be more clearly explained by the process of batting. The batsman places his bat in block, taking up his usual attitude for observation, so that in raising the bat to strike the ball, his volitional centre shall give a certain stimulus for the muscles employed to act in a certain way. These muscles have been selected and grouped and co-ordinated in a higher centre by the fact that the batsman has observed that it is a leather cricket ball that is being used, that it is coming swiftly, and that the character of its pitch is one that will be likely to be hit up, so as to produce a catch on being casually struck, and by the fact that the ground is dry and bumpy and by the position in which the players who are fielding have been placed, and by various other circumstances ; and if he shall have failed to make such necessary observations and modified his brain centre stimulation accordingly, disaster is liable to result. It is well to point out, and it would help to the realisation of such centres, the fact that the volitional centre controls not so much the muscles as the movement which the muscles produce, for if one wants to exercise certain muscles, the volitional centres direct certain movements for which they are known to be needed, rather than the individual muscles that are used. This is, of course, well recognised in training, when certain movements are chosen for developing certain muscles.

If this preliminary sketch and the anatomical and physiological facts are borne in mind, they will help the elucidation of the facts that are set out in the following chapters.

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* An adjective often used in complete ignorance or forgetfulness of its meaning.

Staleness.

This condition is as annoying as it is interesting. The writer does not think any full explanation has been given of this subject. Of course, allusions to it are frequent in nearly every attitude in life. It might be described as a curse that hangs over any engrossing occupation. This is only a *prima facie* description, and it might with greater justice be described as a danger signal of the brain rather than of the muscles being overtaxed. When it is a question of the muscles only, it is a sense of fatigue that arises, rather than a faulty performance, which is the peculiarity of staleness. The effect of staleness is only too well known, but it is more difficult to determine what actually is the process that has taken place. It occurs not only in muscular action, but also in mental processes, and many conditions that one has not recognised as staleness are probably due to that cause. What may be called intellectual work often shows the process. In art, in music, and in fiction, there are innumerable instances in which the effect of staleness may be traced. It is much more apparent in some people and comes on early, but in others it is difficult to trace. All this points to a definite causation which in all probability is of a like nature to that which is produced in physical work. It seems to be really a question of the mental control of the process known as co-ordination. Probably, all brain processes, either mental or physical, involve co-ordination to a greater or lesser degree. The power of judgment in mental or physical acts depends on co-ordination, the relation of one process, be it purely mental or be it purely physical, towards another, and perfect judgment depends on perfect co-ordination and sequence of the various points that affect or influence the issue of a question. By perfect co-ordination, the writer means perfect apportionment of the influence that any one unit should have in influencing the question under consideration. It is implied that this is the case when such expressions are used as " having a complete grasp of the question," " having no sense of proportion." or " being carried away by an idea." Anyone reading this may at first thought wonder what connection staleness has with it. It leads, however, to a correct conception of the process which is indicated when staleness sets in. When staleness is spoken of, in the everyday use of the word, it means mere failure usually in a muscular act, and it might at first thought be conceived that it is due to the exhaustion of some muscle, but on reflection it will be understood that it is not so. The muscles may be as powerful as ever, and sometimes as the result of training more powerful than usual, and yet staleness works its influence. Reflection will show that staleness is really the loss of co-ordination in muscular acts, and in mental processes, a loss of the sense of proportion, so that in the muscular act, the action of the muscles does not produce the desired effect, and in mental processes, there is an inability to form judgments, due to the want of appreciation of the data. The data are not correctly formulated in the mind as they should be, so that mental processes cannot travel fluently along a line of thought. It is now necessary to explain what co-ordination really is. Co-ordination is a process by which association is elaborated to perfection. Certain acts, practically all muscular acts, require for their performance the association and grouping of muscles. In early infant life a baby is capable of making muscular movements, but these movements are at first quite purposeless. It is only in the process of evolution that the muscles become associated for a purpose. In infant life this purpose, although obvious, is not performed. For instance, a baby extends its hand in the direction of its bottle. It is not able to guide its fingers to seize it. The muscles at first are grouped in such a way as to extend the arms in the direction. The muscles required are associated together, but there is only a general tendency towards the purpose. This cannot be efficiently performed until the muscles are co-ordinated, that is, until only the exact degree of stimulus is given to each of the muscles that are associated. This perfected movement means a wonderfully delicate degree of co-ordination, even although it is a somewhat gross act. Just imagine what an enormous degree of co-ordination is required by acrobats in some of their balancing feats. Now, it is interesting to notice that the highest volitional centre has no direct control over any particular muscle, but only over the act that is to be performed. A grouping is a subconscious act and no one is conscious of which muscles he is using, or to what degree they are being used in carrying out the purpose. This is well illustrated in muscular rheumatism, when a patient is quite unaware what movement, in other words, what grouping of muscles, will include the affected muscle, and so give rise to pain. In other words, the highest volitional centre cannot order the muscles, as it were, to perform a certain act, except through a secondary centre, which, however, can only be set in motion by the highest volitional centre, or as a reflex act from some other stimulus. Now, this grouping and co-ordination of groups for certain purposes is a process that goes on through life. This is illustrated by the fact that a middle-aged man accustomed to games as a rule will play some game, new to both, much more successfully at first than a young boy, although the potentiality, that is, the power that can be developed by the boy for this purpose, may be very much greater than that of the man. The grouping and association of muscles for other purposes are already developed in the man, and many of these, it may be, are wanted for the game, whereas this grouping and association has barely begun in the boy, and consequently, although he may become much the finer player, at the start he is more severely handicapped. Therefore the grown man very much more quickly learns to play a game than the boy on the threshold of active life, quite apart from the potentiality of each for the game. It must not be assumed that staleness in games is merely an affection of the highest volitional centre, nor must it be assumed, on the other hand, that such centres are not subject to this trouble, for the voluntary act in deciding to play a game is the outcome of one or more of the highest psychical centres, such as appreciation of the game, which, again, is the outcome of a spirit of rivalry, a desire for association with other people, a desire to be successful, or a wish to take exercise, and so on. It can be seen that many influences are brought to bear upon the highest volitional centre, in order to give rise to the desire that prompts it to direct through secondary centres the preparations and movements that constitute the game. If any of these psychical centres fail, either entirely or to a certain extent, a desire will become more or less stale, and the volitional centre will give half-hearted commands and the game will be played in a desultory way, unless the failing psychical centre receives a fresh impetus which overcomes its staleness. For instance, supposing the spirit of rivalry be wanting in the game of tennis, the game will be played lethargically and without spirit on the part of the individual under consideration. Supposing there be a very close finish to one game, it may so stimulate the spirit of rivalry that the rest of the set is played with enthusiasm. This illustrates what may be appropriately called staleness of the highest volitional centres, which may be further illustrated by the same sort of staleness which results from the degeneration that takes place with advancing life. For instance, the social man ceases to go out to dinner-parties because his hearing is in process of failure, and he cannot converse without effort, and this cause of appreciation of social gatherings having failed, he does not voluntarily go out unless some other psychical influence makes up for the failing one, as, for example, the desire to meet some particular person. The exhaustion of the centre for taste, or for some particular food by over-indulgence in it, is illustrative of the staleness of physical efforts. Hunger, setting up the voluntary act of feeding, may be inhibited by the fact that there is only Devonshire cream to eat, and the brain centre that is involved in the appreciation of Devonshire cream is exhausted or partially or totally destroyed, or perhaps inhibited by over-indulgence, which is subconsciously associated with biliousness, pain, sickness, and vomiting. One is dipping rather deeply into the complex subject of psychology in trying to explain an analagous condition to staleness in these higher and voluntary volitional centres. The writer intends to speak only of the staleness in the physical acts of the games, but these allusions, which may be beyond the scope of this communication, are not really unprofitable, for they place the mind in the sort of groove to be able to understand the points which follow.

So much is taken for granted, not even postulated, which, however, can be explained. In the arguments that the present writer had in *The Field* over the lecture published in the *British Medical Journal* of December 24th, 1910 ("Eye in Sport"), this was particularly illustrated, for when his critics came to any point that was likely to illustrate his argument they said, with a tone of finality, that that point was instinct, whereas it was analysis of what is called instinct that proved the writer's point.

To return to physical acts and staleness connected therewith, it may be remembered that the voluntary volitional centre that directs the act has no direct power over muscles that perform it. It has power only over the brain centres in which are grouped the muscles that perform the actual movement, the sub-conscious associated and co-ordinated centres having control over the details which give rise to the act. It is necessary to digress again to draw attention to a certain fact which is particularly appropriate to the discussion, because it refers actually to the eyes. The muscles concerned in focussing the eyes in reading, in order that the effort may be a continuous one, such as is necessary in reading a book, can only be used continuously up to two-thirds or three-quarters of the total potentiality for focussing; in other words, if the eyes are able to focus print of a certain size as near as six inches from the eyes by a momentary full effort, in order to read print of that size continually, the book will have to be held, it may be, nine inches from the eyes, for at this distance, so great an action of the focussing muscles is not required. If an attempt is made to read, two inches closer, under the same conditions of light, the muscles and the brain centre concerned in this function will soon fail and the book will have to be moved, not merely two inches further off, but to a still further degree. The following points should be remembered, that there is an extreme potentiality available for a momentary act, and that there will be potentiality to a lesser degree for a more continuous use, but if this former potentiality be over-demanded, the potentiality for continuous use will be degraded, which constitutes staleness—in other words, exhaustion of the brain centre that controls the associated use of the muscles used in reading. It will be observed that staleness does not usually occur in absolutely routine work. The golf professional may play continually a fine game. It is only when the condition of rivalry occurs and there is a desire to "go one better" that the individual may become stale. He may keep at one standard in the game, and it is only when he desires to develop greater potentiality that he lays himself open to become stale. In rowing, it is often noticed, that when a boat has learned the necessary details of getting well together, and it is only left to get more pace on, it becomes profoundly stale. That actually has taken place in the exhaustion of the co-ordinating centre. In rowing, for instance, each individual has to co-ordinate his muscles to row in proper form and to keep time with the rest of the crew. When they have achieved good form in paddling and are well together, in other words, have continually co-ordinated their muscles, they begin to get the most they can out of their co-ordinated muscles, and they can for a time make use of this centre in increasing degrees, but for a continuous effort, a certain degree less than their full potentialities has to be used. Once they exceed this amount, the centre becomes exhausted and ceases to co-ordinate the muscles correctly, so that in rowing they do not get the work on at the same moment, and in tennis the ball is hit into the net instead of just over it, and in cricket the bowler gets wide, etc The action of the co-ordinating centres is probably one of restriction rather than of acceleration, restricting the stronger muscles in the process of co-ordination to the capabilities of the weaker muscles, so that the action of a muscle, when working in a co-ordinate group, is less than its actual potentiality of work, the centre, as it were, restricting the muscles that represent the stronger links of a chain to the standard of the muscles that represent the weakest link.. When the centre is thus exhausted, the remedy is rest and break-up of the routine that has been established, so that , as it were, the co-ordination centre can make a fresh start.

It might appear from this description that it would be impossible for the player to improve, because directly he seeks to do better, he becomes stale. This is not so, however, for his exercise in co-ordinating the muscles tends to more accurate co-ordination and to greater muscular power through the co-ordinating centre, so long as the centre is not overworked, and consequently does not become exhausted. It generally turns out that, directly a player begins to feel his feet in any game and to excel in it, he is led on to excess or is deliberately driven into it by his trainer in the case of rowing.

In conclusion, the writer confesses that he has great diffidence in thus dogmatising on a subject which opens up a vast field of conjecture, but he believes the views he propounds have at least the merit of plausibility, and so far as they go are founded on physiological truth.

(*To be continued.*)

A PECULIAR FORM OF RETINAL ATROPHY IN THE DOG.

BY

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LONDON, ENGLAND.

In a recent volume of the *Proceedings Royal Society of Medicine* (Vol. VII, Section of Ophthalmology, p. 10, 1913), I described a form of retinal degeneration in the dog which differs in some particulars from any type rendered familiar by human pathology. An opportunity of examining a second similar case, and this time of seeing the animal during life, is my excuse for renewing the subject.

Case I.

SUMMARY.

Blindness of seven weeks duration in a collie, aged 2 years. No history of distemper or other illness. External and ophthalmoscopic appearances normal.

Microscopically, profound degeneration of the retina, affecting chiefly, and in the first place, the bi-polars of the inner nuclear layer; in its more advanced degrees involving also the rods and cones and outer nuclear layer. Ganglion cell and nerve fibre layers very well preserved, even in the most atrophic areas. Little or no optic atrophy; no adhesion between retina and choroid, and no disorganisation of the inner choroidal layers. Slight irregularity of the pigment epithelium in places; and in the more atrophic areas some pigment invasion of the retina. Collections of mononuclear cells round some retinal, and a few choroidal, vessels. No other structural alterations in the choroid.

I am indebted for this specimen to Mr. Walter Edmunds, F.R.C.S., and to Mr. Craig, M.R.C.V.S., of the Brown Institute.

The condition occurred in a collie, aged 2 years. For seven weeks the owner had noticed that the sight was defective, and when the animal was admitted to the Brown Institute, it was quite blind. It had probably never had distemper, and under observation showed no signs of disease of any kind. There was no history of injury, or of the use of drugs, and there had been nothing peculiar in its upbringing or dietary, which included meat. The external appearance of the eyes was normal, except that the pupils were fully dilated and did not react to light. Ophthalmoscopic examination was easy, and showed no manifest abnormality either in the fundi or discs. After being kept under observation for some months, during which no change took place, the animal was destroyed. The eyes were immediately removed, fixed in Zenker's fluid, and after hardening, divided vertically.

Microscopical Examination.

The disease is slightly more advanced in one eye than the other, but so similar in both that one description may suffice. The cornea, iris, corneo-iridic angle, ciliary body, and lens are normal.

The retina shows a peculiar type of degeneration which is least pronounced towards the ora serrata and in certain areas in the lower part of the eye, and most pronounced in the upper part, over the tapetum.

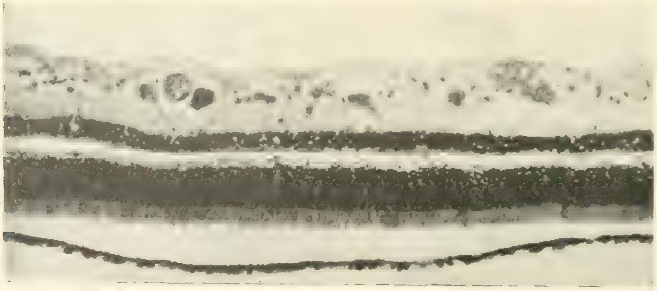

FIG. 1.—Normal retina of the dog.
(From *Proc. Roy. Soc. Med.*, Vol. VII.)

Taking first one of these best preserved areas, *the outstanding feature of the degeneration is its incidence on the bi-polar cells of the inner nuclear layer.* In the normal retina of the dog this layer is well developed and contains 3 to 5 strata of cells (Fig. 1); in the present instance it never consists of more than a single layer, which is irregular and interrupted in places (Fig. 2). The nuclei are comparatively large and pale and probably belong to the fibres of Müller; it is doubtful if any nervous elements have survived.

The outer nuclear layer has undergone comparatively little change. There is slight loosening of structure, and the innermost cells tend to encroach to some extent on the outer reticular layer, which in any case is narrower than in the normal retina. The rods and cones are normal.

The inner reticular layer is also considerably atrophied, but not so much so as the outer. The ganglion cell and nerve fibre layers are much the best preserved. Probably a certain number of the ganglion cells have disappeared, but many remain, and these show little change; their cell processes are sometimes atrophied, giving them a rounded rather than an irregular figure, but the Nissl granules are intact and there is no vacuole formation in the protoplasm. The nerve fibre layer shows little, if any, atrophy.

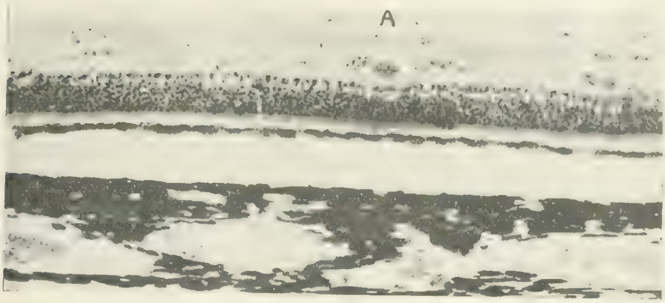

FIG. 2.—The rod and cone and external nuclear layers show very little change, the nerve fibre layer is practically normal and the ganglion cells (scanty in this part of the retina) are fairly well preserved. The chief abnormality is an atrophy of the inner nuclear (bi-polar) layer, and of the reticular layers on each side of it. A = ganglion cell.

As a transitional stage between these changes and the higher grades of atrophy one finds next a degeneration of the rods and cones, varying from slight irregularity and disorganisation, with a little loosening and atrophy of the corresponding nuclei, to a complete disappearance of both layers.

These changes reach their most extreme degree over the tapetum, and generally in the upper part of the globe. The rods and cones are entirely absent, and the sole representatives of the two nuclear layers are a few nuclei of doubtful origin; only in one place, near the ora serrata, can the cells be distinguished as belonging to the outer nuclear layer; it is probable that the bi-polars have completely disappeared. On the other hand, the ganglion cells, normally more numerous here than in the lower part of the eye, are extraordinarily well preserved (Fig. 3, A). Their nuclei and nucleoli stain perfectly, and their protoplasm is intact and contains numerous normal Nissl granules. In many places the atrophy of the outer layers is so complete that the ganglion cells rest directly on the limitans externa. The nerve fibre layer shows little evidence of atrophy.

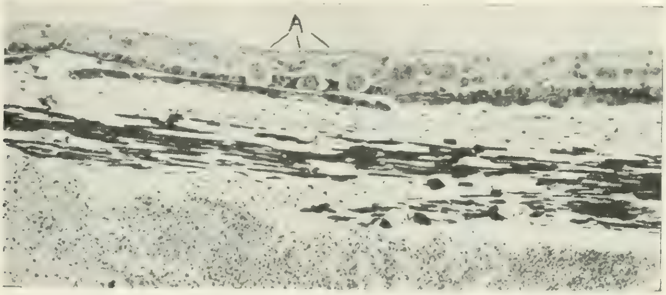

FIG. 3.—More profound changes over the tapetum. The outer layers of the retina have almost completely disappeared. The ganglion cells (A), on the other hand, are well preserved, and owing to the atrophy of the outer layers, rest directly on the limitans externa. There is no true adhesion between the retina and choroid.

Neither here, where the degeneration is most profound, nor elsewhere is there any true adhesion between the retina and choroid, still less any formation of cicatricial membranes. In some of the more atrophic areas below there is slight irregularity of the pigment epithelium, but no pigment invasion of the overlying retina. Over the tapetum of the dog the pigment epithelium is normally either unpigmented or contains only a few granules; or it may contain more abundant pigment, which, however, is much lighter in colour and less granular in texture than the rich brown grains and needles of the normal epithelium. In the present instance the pigmentation is of this last type, and there is considerable invasion of the retina in the form of large pigmented cells, sometimes grouped, which are probably either macrophages or displaced elements of the pigment epithelium itself. Extracellular pigment does not seem to be present.

The retinal vessels show no change in their walls, but many of them are surrounded by collections of mononuclear cells. Patches of similar infiltration occur in the fibrous tissue surrounding the central vessels near the lamina, and in the walls of some of the larger vessels on the papilla.

The optic nerve shows no manifest atrophy.

In the choroid the only definite change which can be demonstrated is the presence of a few small collections of mononuclear cells, similar to those already described in the retina, and here also situated in the immediate vicinity of vessels. There is no evident degeneration or diminution in number of the larger vessels. The state of the chorio-capillaris is difficult to determine in uninjected specimens, but it can be seen, and appears to be normal in many places, even in areas where the retina is highly degenerated. Certainly there is no trace anywhere of gross disorganisation or cicatricial disturbance of the inner choroidal layers.

Case II.

The following is an abbreviated account of the case previously reported :

The dog became blind after a bad attack of distemper with high fever. There was no opportunity to make an ophthalmoscopic examination. In the retina (Fig. 4), which alone shows changes, the nerve fibre and ganglion cell layers have undergone little alteration ; there is slight vacuolation of some of the ganglion cells, but the Nissl granules are mostly intact ; the cell processes are less prominent than normal. The inner reticular and inner nuclear layers have chiefly suffered. The former is so atrophic that in places the ganglion cells are almost in contact with the inner nuclear layer ; in the latter there is a great diminution in the number of cells, and those which remain are irregular in form and size, stain imperfectly, and tend to transgress the normal limits of their layer. The external nuclear layer shows only a little scattering of its cells, and the rod and cone layer is intact. The retinal vessels are normal.

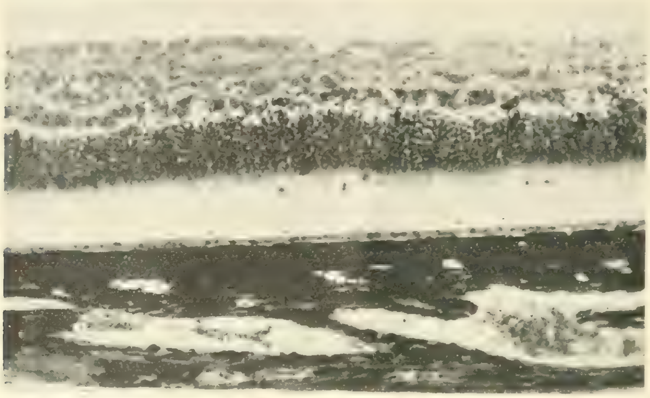

FIG. 4.—The case previously reported. The changes are similar to those shown in Fig. 2.
(From *Proc. Roy. Soc. Med.*, Vol. VII).

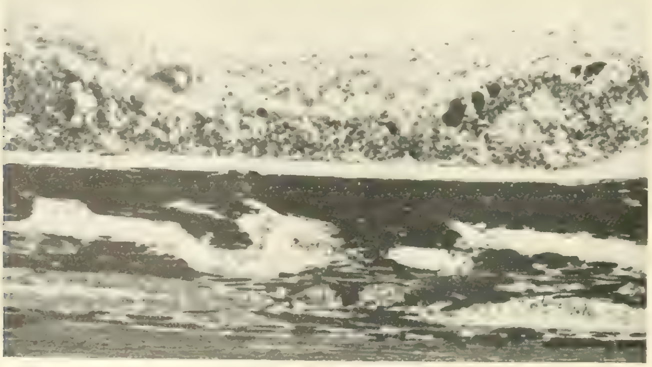

FIG. 5.—From the same case. The changes are comparable with those shown in Fig. 3, but less in degree.

(From *Proc. Roy. Soc. Med.*, Vol. VII).

In certain circumscribed areas (Fig. 5), however, the disease is more advanced. The rods and cones have disappeared ; the cells of the outer nuclear layer are irregular and scattered, and in places break through the limitans externa. In these situations also there is often some agglutination of the retina and pigment epithelium, and in places the latter is interrupted, but there is no formation of cicatricial membranes in the subretinal space, or disorganisation of the inner layers of choroid. The inner nuclear layer is not separately traceable, and comparatively few ganglion cells remain. There is some fragmentation and clumping of nuclear substance. Pigment invasion of the retina is slight, and present in only a few situations. No change can be detected in the choroid, even beneath the areas of most pronounced retinal atrophy. The nerve is not atrophic, and there is nowhere any evidence of past or present inflammation.

In commenting on this case, a circulating poison with a specific, but not exclusive, affinity for the bi-polar cells of the inner nuclear layer was hypothecated It was supposed that these cells were first affected, but that where the toxic action was more intense the outer layers were also involved ; the much slighter changes in the inner layers might be due to the same cause, or might be secondary to the atrophy of the bi-polars. In the case previously reported the blindness followed an attack of distemper, which seemed therefore the most probable source of the toxine. In the present instance there is no such history ; whether or not the dog ever had distemper, it was healthy from the first onset of defective vision until its death. If the condition be not an "abiotrophy," therefore, which seems unlikely, considering the occurrence of circumscribed patches in which the outer layers also were degenerate, its primary cause remains obscure.

A former suggestion that in the absence of appreciable choroidal change and optic atrophy the ophthalmoscopic appearances might be normal, receives confirmation from this new case. Evidently, the very slight irregularities in the pigment epithelium below were insufficient to produce visible changes, while above, over the tapetum, the more pronounced disturbances of the same layer failed to show up, partly on account of the lightness of the pigmentation, partly on account of their being masked by the brilliant reflex from the underlying tapetum.

CLINICAL MEMORANDUM.

TWO CASES OF PARALYSIS OF THE CERVICAL SYMPATHETIC FOLLOWING DELIVERY BY FORCEPS.*

BY

Harold Burrows, M.B., B.S., F.R.C.S.,

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Case I.—Mrs. S. has enophthalmos, ptosis, and contracted pupil in left eye, which, she says, dated from birth. The labour was difficult, and instruments were used.

Case II.—W. J., aged 14 months. The birth was difficult, and instruments were used. For a few days following birth the left eye was closed by swelling of the lids. The mother says the baby had a "black eye," and that when the lids were opened on the third day, some blood escaped. The child now has enophthalmos, ptosis, and contraction of the pupil of the left eye. The left pupil does not dilate when cocaine is dropped into the eye.

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* Cases exhibited at the Provincial Meeting of the Section for the Study of Disease in Children, Royal Society of Medicine, July 6th, 1914.

NOVELTIES.

A NEW PERIMETER.

Holth, S.—The chord perimeter. A cheap pocket instrument for accurate measurement of the field of vision. (Das Kordenperimeter. Ein billiges Tascheninstrument für gute Gesichtsfelduntersuchungen.) *Actes du XII Congrès International d'Ophtalmologie,* Tome I, Petrograd, 1914.

The perimeter has undoubted value as an aid to diagnosis in many conditions which come under the care of the physician, and especially of the neurologist. If it is not in universal use, this is largely due to two factors, namely, the cost and the bulk of most of the instruments in the market.

Some years ago, **Holth,** of Christiania, devised an instrument which overcame these drawbacks, and the present communication describes it in its latest form.

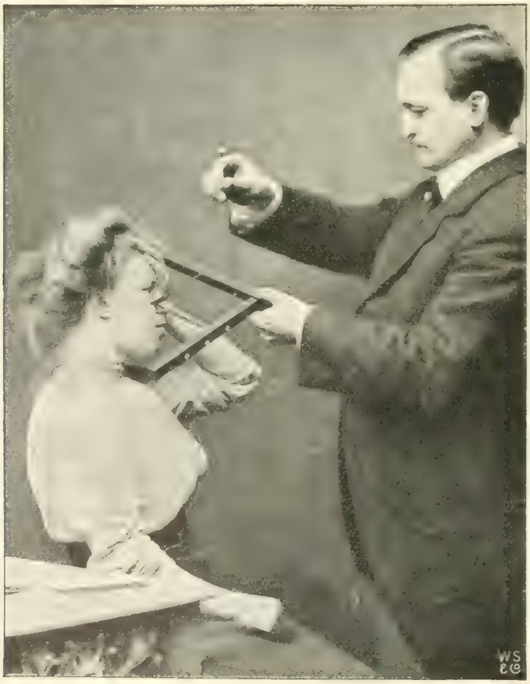

FIG. 1.

Fig. 1 shows the instrument in use, while Fig. 2 illustrates the principle of its construction. The semicircular arc of the ordinary perimeter is replaced by two straight wooden rods, representing the chords of the two quadrants which would make up the arc. The graduations on these rods are the graduations of the arcs projected on to their chords. The rods are hinged together, like a foot rule, so that they can be folded up for convenience in carrying. When the perimeter is in use, the wooden rods are supported by two slender metal rods whose joint occupies the centre of the semicircle. This joint is placed on the orbital margin, below the eye when the horizontal, or nearly horizontal, meridians are being measured, and near the inner canthus when the more vertical meridians are being taken. The white or coloured test objects are carried along the chords, a small fixation spot being placed at the angle between them. One of the wooden limbs is made hollow to contain the object holders. On the outer sides of the rods small spots of coloured celluloid are inlaid to be used in testing for central colour scotomata according to the method recommended by Holth (*Annales d'Oculistique*, 1908).*

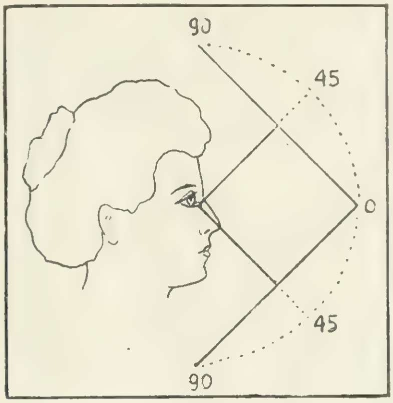

FIG. 2.

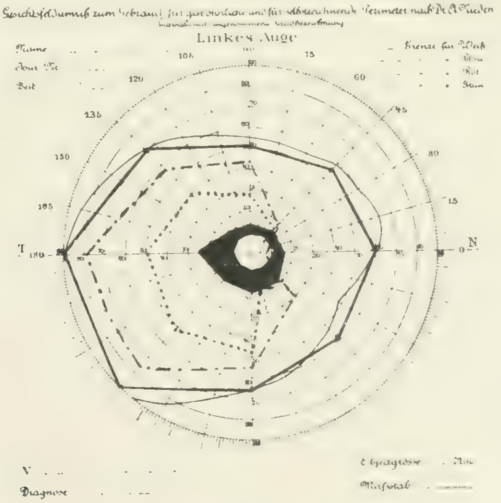

FIG. 3.

Holth claims that the error introduced by the fact that the visual angle of the test object at 45° must be greater than that of the same object at 0° or 90° is negligible. A much more likely source of error, and one to which all forms of perimetry are liable, is the intensity of the illumination at the time of the testing, and he strongly recommends that every chart should be compared with another taken from a normal individual under identical conditions. The chord perimeter is provided with no attachment to indicate the meridians. This is considered unnecessary, as it is easy to gauge the positions of the eight or twelve chief meridians usually measured. Fig. 3 shows a field with ring scotoma taken with the chord perimeter in the eight principal meridians only. Fig. 4 illustrates the method of occluding one eye by an aluminium shield fixed in position by a strip of leucoplast, but the fellow eye can be occluded by the hand as shown in Fig. 1. The perimeter costs about ten shillings, and the aluminium shields, for right and left eyes, about one shilling each. (M. Gallus, Pilestraedet 7, Christiania.) The author recommends Nieden's charts, as shown in Fig. 3. These are printed on both sides of the paper, and are obtainable from Bergmann, Wiesbaden, at one shilling for fifty.

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* For abstract, see THE OPHTHALMOSCOPE, 1908, p. 978.

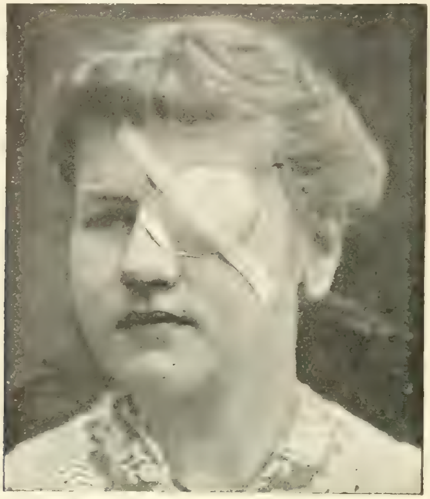

FIG. 4.

A. J. BALLANTYNE.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—COLOUR-VISION.

(1) Voirol, A. F. — Researches upon the refraction, visual acuity, colour sense, and muscle balance of the eyes of 939 school children. (Untersuchungen ueber Refraction, Visus, Farbensinn und Muskelgleichgewicht an den Augen von 939 Schulkindern.) *Zeitschrift für Augenheilkunde,* August, September, 1912.

(2) **v. Rostschewski-Saraton.**—On my modification of Holmgren's method of testing the colour sense. (Ueber meine Modification der Holmgrenschen Methode der Farbensinnprüfung.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1912.

(3) **Grossmann, Carl.**—The Board of Trade standard of eyesight for sailors. *British Medical Journal*, October 19th, 1912.

(4) **Nettleship, E.**—Colour blindness in two sisters and all their sons.

(5) **Usher, C. H.**—A pedigree of colour blindness. *Transactions Ophthalmological Society U.K.*, Fasc. 3, 1912.

(6) **Nettleship, E.**—A pedigree showing ocular blindness in both sexes and also a digital deformity.

(7) **Nettleship, E.**—Some unusual pedigrees of colour blindness. *Transactions Ophthalmological Society U.K.*, Fasc. 3, 1912.

(8) **Fergus, A. Freeland.**—Subjective colour sensations in retinitis pigmentosa. *Ophthalmic Review*, January, 1913.

(9) **Stilling, J.**—Some remarks on colour testing. (Einige Bemerkungen ueber die Farben-prüfung.) *Centralbl. f. prak. Augenheilkunde*, März, 1913.

(10) **Caillaud.**—Colour vision in candidates for employment on the railway. (La vision des couleurs chez les postulants aux emplois dans les chemins de fer.) *L'Ophtalmologie Provinciale*, août, 1913.

(11) **Köllner, H.**—An instructive case of pretended congenital colour blindness. (Ein lehrreicher Fall konsequenter Simulation angeborener Farbenschwache.) *Zeitschrift für Augenheilkunde*, Juni, 1914.

(12) **Taylor, George Henry.**—Clinical note on examination of colour blindness by the lantern tests. *Ophthalmology*, July, 1914.

(1) **Voirol**, of Basle, has conducted another of those laborious and painstaking researches upon the refraction in school children which are so numerous in Germany. He has come to exactly the same conclusions that his predecessors have done, and has given us statistical tables which confirm those which have already appeared. Unfortunately, these valuable statistics have not furnished us with any solution of the myopia question, which is so urgent in Germany, where 50 per cent. of the professional classes are shortsighted. All that we have learnt is that confinement for long hours in schools, without adequate exercise, is a factor in the ætiology of myopia of moderate degree; nothing more.

The author's conclusions are as follows:—

(1) The normal refractive condition of the newly-born, hypermetropia, is present in one-third of all the school children of the first school year. As age advances, it tends more and more to be replaced by emmetropia and myopia.

(2) Pathological astigmatism is present in 13 per cent. of the children. The younger children furnish more cases than the older, a fact which lends colour to the view that astigmatism has a tendency to get less as time advances.

(3) The large majority of the children had an acuity greater than unity; only 14 per cent. fell below this figure, of whom half were astigmatic.

(4) Myopes had a greater inter-pupillary distance than the others.

(5) Insufficience of the recti interni was the most common error of muscle balance, and was found in 14 per cent. of the children.

(6) Well marked red-green colour blindness was detected in 1·3 per cent. of all those examined. It was ten times more common in boys than in girls.

T. HARRISON BUTLER.

(2) **v. Rostschewski-Saraton** states most absolutely that *the ordinary Holmgren test is useless*, thus agreeing with almost every ophthalmologist who has any practical experience in testing for colour blindness. To get an accurate determination of the colour vision of the fovea, the objects must not subtend a greater angle than 1°. The ordinary testing is carried out at a distance of 75 centimetres, so the inventor has had balls of wool made of 5-7 mm. in diameter. These correspond in colour to Holmgren's skeins of wool, and are used instead of them. They are placed upon a grey background, and the examinee is made to match these confusion colours in the ordinary way We ask, why is he not made to name the ordinary colours, blue, red, green, brown, pink, and grey, as well as to match them? T. HARRISON BUTLER.

(3) **Grossmann**, of Liverpool, discusses the proposed Board of Trade alteration of the standard of eyesight for sailors. Not only does he not consider the new standard too high, but thinks it is actually not high enough. He thinks that every sailor should have his sight tested compulsorily and the exact amount of vision stated on his papers. Sailors should be allowed to wear glasses if the vision can be brought up to standard with them. He tabulates the minimum demands for those in charge of the vessel as follows:

A.—FORM VISION.

(1) The proposed new Board of Trade standard is not only not too high, but, on the contrary, too low.

(2) It should be 20/20 for each eye separately.

(3) Vision which can be brought up by the help of spectacles to 20/20 or above, should be admitted.

(4) Vision should be tested, not only in the case of ship's officers, but of every sailor, and should be noted on the papers of each man.

(5) Vision should be tested not only for daylight, but also for night, and the result noted on the papers of each man, so that the skipper may know whom to place on the look-out, and whether in daytime only or also at night.

(6) Re-testing should take place at certain regular intervals, so as to make known any subsequent changes (defects) to the men themselves and to the owners, such changes not necessarily disqualifying from further service, and especially not if correction be possible by glasses.

B.—COLOUR VISION.

(7) The Holmgren test is unreliable.

(8) A lantern test is required with a suitable lantern.

(9) The lantern test suggested in the Departmental Committee's report is quite inadequate.

(10) Each eye should be examined separately.

(11) Every sailor, officers and men, should be examined and the result noted on his papers, for the reason stated under No. 5.

(12) Colour vision should be re-tested at certain intervals, as there is such a thing as acquired coloured deficiency without much deterioration of form vision; the result should be noted on the man's papers (see No. 6).

(13) A colour ignorance test is superfluous.

(14) All tests for vision should be made by properly qualified men.

In the Discussion which followed the reading of Grossmann's paper (Annual Meeting of the British Medical Association, Liverpool, 1912) the Departmental Committee's report was severely criticised. At the same time most of the speakers disagreed with Grossmann as to the wearing of spectacles by sailors. ERNEST THOMSON.

(4 and 5) The colour blind pedigrees, by **Nettleship**, of London, and **Usher**, of Aberdeen, respectively, must be studied in the originals.

(6 and 7) The pedigrees of colour blindness related by **Nettleship** must be studied in the original.

(8) The patient, whose condition is here recorded by **Fergus**, of Glasgow, had been under observation for twenty years, and had been unable to read or write for twelve years. She had recently had the sensation of a black network before the eyes; this became a silvery cloud; and then violet, red, and other colours. Probably "this onset of coloured vision indicates the last stage of retinal destruction." There is a history of consanguinity in the case, the parents being first cousins. A. H. PAYAN DAWNAY.

(9) This is a controversial paper in which **Stilling**, of Strassburg, throws some doubt upon the accuracy of the observations made by Napp at a meeting of the Berlin Ophthalmological Society. A. LEVY.

(10) **Caillaud**, of Orleans, examined, during a period of six years, about 15,000 men who were candidates for employment on the railway. The employees are classified into three groups, according as the safety of the public, their own safety, or neither is concerned. Those in the first two groups must have normal colour vision.

The writer used Holmgren's wools, and tested each eye separately. He found that five or six per cent. named the colours incorrectly, and confused green, blue, and violet. They were not examples of Daltonism or dyschromatopsia, but they had an insufficiently educated colour sense. This is a condition that is rarely found amongst women; it can, like the other senses, be developed by use: it is said that certain workmen can differentiate between 200 shades of black.

The candidates that were referred back on account of their imperfectly developed sense were able to pass later on after proper education. Cases of Daltonism may also show imperfectly developed colour sense, but these can be detected, as they confuse reds and greens. Those with a slight degree can differentiate between the darker tints of red and green, but are easily detected when the paler tints are presented to them.

The confusion of colours was always the same for each eye, taken separately. In these cases the visual acuity was always normal and in many cases above normal. P. A. HARRY.

(11) **Köllner**, of Würzburg, describes a case of a railway man who disliked giving out tickets. To obtain a change of employment, he said that he could not distinguish between green and grey; all green appeared grey to him. Vierling, of Mainz, detected the fraud, and sent the man to Köllner. The paper recounts in detail the man's answers to the various tests used. As a study in psychology, the paper is interesting. T. HARRISON BUTLER.

(12) The cases briefly reported by **Taylor**, of Sydney, illustrate the discrepant results obtained by the different tests. A. J. BALLANTYNE.

II.—OPHTHALMIA NODOSA.

Dalmer, Max.—A contribution to ophthalmia nodosa. (Beitrag zur ophthalmia nodosa.) *Zeitschrift für Augenheilkunde*, Oktober, 1912.

Dalmer, of Giessen, describes two cases of ophthalmia nodosa.—A man had received a blow from a twig; a swelling developed in which caterpillar hairs were present. A boy had a black caterpillar thrown at him by his brother. Severe pain at once set in, and soon two miliary nodes were present, in one of which a hair was detected with Czapski's *loupe*; in the other, three were found. Eight hairs were seen embedded in the cornea; one had perforated it and touched the iris. The nodes were excised, but, later, ciliary injection set in, and a hair was seen free in the anterior chamber. Other nodes developed, and at this stage the parents removed the boy from the clinic. The larval hairs in the second case belonged to *Bombyx rubi*. The author draws attention to the wandering habits of the hairs, and suggests that the first case was infected by hairs which caterpillars had shed on to the twig which struck the eye. T. HARRISON BUTLER.

III.—OPHTHALMOLOGY AND GENERAL MEDICINE.

(*First Notice.*)

(1) **Tornatola.—Polioencephalitis and papillitis from intestinal autointoxication. (Poliencefalite e neuro-papillite da auto-intossicazione intestinale.)** *Riv. Ital. di Ottal.*, Marzo, Aprile, Maggio, 1914.

(2) **Holden, Ward A.—A fifth case of acute disseminated myelitis with retro-bulbar inflammation of the optic nerve.** *Arch. of Ophthalmology*, Vol. XLIII, No. iii, May, 1914.

(3) **Alvaradó.—Notes of some complications of diabetes mellitus, especially of changes of refraction. (Notas sobre algunas complicaciones oculares en la diabetes azucarada especialmente de los cambios de refraccion.)** *Archiv. de Oftal. Hisp.-Amer.*, Juno, 1914.

(1) **Tornatola** holds that many cases of polioencephalitis are confused with cases of intracranial tumour, on account of the similarity of symptoms, especially from double papillitis, and further that the importance of autointoxication from the intestinal tract as a cause of polioencephalitis has not been generally recognised.

He is of opinion that the immediate cause of the symptoms comes to the eye not from brain along the sheath of the optic nerve, but is brought to the eye through the general circulation.

He says that in several cases he has corrected the diagnosis of cerebral tumour in favour of one of encephalitis, but he does not say in this paper on what grounds this diagnosis was made; he says indeed that the symptoms are identical and it is certain that in a majority of cases, headache, vomiting, and optic neuritis are found with cerebral tumour.

Although, therefore, we may agree with Tornatola that certain forms of intestinal intoxication may give rise to optic neuritis, we remain in doubt how to diagnose them. HAROLD GRIMSDALE.

(2) **Holden,** of New York, adds a fifth case to the four he has already published, and draws attention to a sign he has noticed in three out of four cases in which the fields could be taken, *viz.*, a lateral hemianopia in the field of one eye only. R. H. ELLIOT.

(3) **Alvaradó**, of Valladolid, gives details of two cases in which myopia without any opacity in the lens, appeared in the course of diabetes, and in one case in which hypermetropia appeared or increased during the illness.

HAROLD GRIMSDALE.

IV.—REFRACTIVE INDICES OF THE MEDIA OF THE EYE.

Cirincione.—On the refractive indices of the ocular media at the normal temperature. (Sull' indice di rifrazione dei mezzi oculari alla temperatura normale.) On the indices of the refractive media of the human eye. (L'indice dei mezzi rifrangenti dell' occhio umano normale.) *La Clinica Oculistica*, Marzo-Giugno, 1913.

In these two papers, which are really part of one whole, **Cirincione** takes up the question of the index of the several refractive media. He deals first with the various methods which have been adopted to measure the index accurately, and decides that the two principal methods are those of Brewster and Abbé; of the two he considers that of Abbé simpler and more easy to handle, and therefore he has adopted it for these investigations.

In the preliminary work he shows that the temperature at which the humours are examined has a very important bearing on the index, and from this he draws the conclusion—which seems justified—that all preceding measurements, which have not taken this factor into account, are inexact.

He shows that the index of distilled water varies from 1 3331 at a temperature of 16° C. to 1. 3300 at a temperature of 41° C. and that the neglect of the factor of temperature accounts for the variations in the estimates made by previous observers.

He comes to the conclusion that, when the aqueous is measured soon after death at the normal body temperature, it is homogeneous and has a stable index, but that the index varies according to the temperature and the time after death. The vitreous is also homogeneous. The cornea, however, has various layers having various indices, but the parts are so compactly held together and the form is so stable that no error is likely to follow the adoption of a single index for the whole cornea.

The lens is even more variable; the most refractive part, the nucleus, is situated rather behind the centre of the lens, towards the posterior surface. The strata of the lens vary in index according to the age of the animal; no other of the refractive media show any similar variation.

As a result of his measurements of human structures, Cirincione concludes that the human aqueous and vitreous do not vary appreciably from those of animals, the index of the aqueous being 1.33325, and of the vitreous 1.33312.

The cornea is, on the other hand, higher in refractive index than in other animals; in man this index is 1.3731.

The various strata of the lens show marked differences of index, and the changes in age are, probably owing to the long life of man, more marked than those found in animals. HAROLD GRIMSDALE.

V.—THE PATHOGENY OF COLOBOMA OF THE EYEBALL.

Roth, H. and M.—Contributions to the pathological anatomy and pathogenesis of coloboma of the eyeball. (Beiträge zur pathologischen Anatomie und Pathogenese der angeborenen Kolobome des Augapfels.) *Arch. f. vergleichende Augenheilkunde,* Bd. IV, Heft ii, S. 130, 1914.

H. and M. Roth, of Leipzig, report and comment upon three cases of congenital coloboma of the globe. In the first, derived from a new-born infant, the line of the fœtal cleft was occupied by a thick strand of fibrous tissue which projected into the vitreous, and adhered to the lens capsule in front. Many vessels were contained in the strand, but central vessels were absent from the nerve. In the region of the coloboma, the choroid was absent, while at its edge, the retina showed the usual duplicatures. Elsewhere, however, the retina was normally developed, and fovea was even distinguishable.

A more peculiar observation was the development of indubitable sphincter muscle tissue from the pigment epithelium in localised areas far removed from the iris. This evidence that any portion of the retinal epithelium is capable, in certain circumstances, of producing involuntary muscle is of much interest. It adds one more to a series of observations recorded by the reviewer (THE OPHTHALMOSCOPE, Vol. VII, p. 724, 1909), which show that in congenitally abnormal eyes the cells of one layer of the optic vesicle may develop into structures which are normally only derived from the other; or that from a given portion of one of the layers, tissues may develop which should only originate from some other portion of the same layer. For instance, from the outer layer, which normally only forms pigment epithelium, retina may be developed; or both layers may be pigmented on the ciliary body; or the external layer on the choroid may be unpigmented; or pigmented and unpigmented epithelium and retina may be found in the nerve. The findings in the present case clearly fall into line with these observations.

In the second case the specimen was derived from an adult. From the posterior part of the coloboma a mesoblastic strand ran forward into the vitreous. Its vessels were connected with the central vessel system, and also with those of the sclera. A coloboma at the nerve entrance was present. At the corneo-iridic angle the ligamentum pectinatum was developed to a degree unusual in man.

In the third case, also, a large mesoblastic strand projected from the nerve into the vitreous. The nerve contained no central vessels. The retina showed an inverted arrangement of its layers in places, and beneath the mesoblastic strand it was evaginated into a sac-like ectasia. At the edge of the coloboma, duplicatures and rosette-formations were present. The pigment epithelium was irregular, and in a number of situations, apart from the line of the cleft, was interrupted by areas of vascular fibrous tissue which occupied the subretinal space. The vascular supply of the retina was derived from the mesoblastic tissue at the nerve entrance.

These cases seem to the authors to lend support to the theory that coloboma is due to abnormal persistence of mesoblast, rather than to any deficiency of proliferative energy on the part of the optic vesicle. The permanent presence of vascular tissue favours the first view, while the exuberant folding of the retina at the edge of the coloboma seems to negative the second, and to indicate rather an attempt of the edges of the cleft, by proliferation, to overcome an obstacle. Moreover, the normal development of the retina elsewhere, and the formation even of a fovea in one case, go to disprove an hypothesis of imperfect developmental vitality in the epiblast.

GEORGE COATS.

VI.—SYMPATHETIC OPHTHALMITIS.

(1) **Meller.** — **Upon the question of a spontaneous sympathetic inflammation. (Zur Frage einer spontanen sympathisierenden Entzündung.)** *Zeitschrift für Augenheilkunde*, November, 1913.

(2) **Grandclément.—The causes, pathogeny, and nature of sympathetic ophthalmitis. (Causes, pathogénie, et nature de l'ophtalmie sympathique.)** *Journ. des Médecins practiciens de Lyon et de la Région*, 15 mars, 1914.

(3) **Pyle, Wallace.—Sympathetic ophthalmia with report of three cases.** *Ophthalmology*, July, 1914.

(1) **Meller,** of Vienna, was one of the first to throw doubt upon the generally accepted idea that sympathetic ophthalmia could only follow a perforating wound. The present paper is written to support the opposite view held by Elschnig and others, namely, that a wound is not essential to the development of this type of irido-cyclitis. Fuchs has stated, and his opinion has obtained wide credence, that the type of inflammation which is found in an exciting eye and also in the sympathising eye, is quite different in character from ordinary inflammation. We do not find the typical infiltration with small polymorphonuclear leucocytes. The lymphocyte takes its place. There is no tendency to abscess formation and necrosis, but rather an excessive formation of fibrous tissue with a strong tendency to contract. There are other well-marked points of difference. Fuchs' view has been criticised. It has been stated that the Fuchs type of inflammation is not essentially characteristic of sympathetic disease. Meller describes two cases. In the first an eye became spontaneously diseased, and when examined histologically, the inflammation closely approximated to the type described by Fuchs. In the second case the right eye became inflamed some time after the original irido-cyclitis in the left. Again the Fuchs inflammation was present. These two cases, and others cited by Meller, do not prove that sympathetic ophthalmitis can originate without a perforating injury. They can equally well be used in support of the view that the Fuchs type of inflammation is not exclusively associated with sympathetic disease.

The histology is made clear by two excellent plates.

T. HARRISON BUTLER.

(2) On the strength of five cases of sympathetic ophthalmitis, **Grandclément**, of Lyons, concludes that the affection results only from a wound of the ciliary body of the exciting eye (*l'œil sympathisant*), left exposed for a certain length of time to the air or to the contamination of the conjunctival secretions. In this way and by these means the (assumed) special germ of the malady becomes deposited in the substance of the ciliary body. Grandclément believes that a special micro-organism, which he speaks of as the *microbe sympathisant*, is contained in the tears, mixed with such familiar organisms as staphylococci, streptococci, pneumococci, etc. This hypothetical germ is able to develop

and proliferate only in the ciliary body or ciliary processes of the wounded eye, whence it, or its toxins, find their way to a similar anatomical site in the uninjured eye, probably by the nervous pathway. The microbe, like those of tetanus or hydrophobia, has an incubation period of from eighteen to thirty days ; is not pyogenic ; and always develops on the same soil, having leaped a large organic circuit in doing so. Finally, like the bacteria named, the *microbe sympathisant*, or its toxic products, appears to pass along the nerves and nervous system rather than along the blood- or lymph-vessels.

SYDNEY STEPHENSON.

(3) **Pyle**, of Jersey City, after describing three cases of sympathetic ophthalmia, in which little or no success was obtained, in spite of vigorous treatment, discusses briefly the familiar problems regarding the ætiology, diagnosis, prognosis, and treatment of the condition. He concludes that the nature of the disease is still a mystery ; that cures are rare and relapses common ; that the blood picture is a valuable aid to diagnosis ; that enucleation does not prevent, although it reduces the danger of sympathetic ; and that we have as yet no specific for the disease. A. J. BALLANTYNE.

VII.—SYPHILIS AND THE EYE.

(1) **Rollet.—Syphilitic pseudo - hypopyon. (Le Pseudo - hypopyon syphilitique.)** *L'Ophtalmologie Provinciale*, août, 1912.

(2) **Bruner, W. E.—Hemianopsia of luetic origin with partial recovery.** *Ophthalmic Record*, September, 1912.

(3) **Fischer-Galati.—A primary sore of the conjunctiva of the upper lid. (Syphilitischer Primäraffekt der Bindehaut des Oberlides.)** *Zeitschrift für Augenheilkunde*, Oktober, 1913.

(4) **Mohr and Bech.—Papillitis an early symptom of congenital syphilis. (Papillitis als Frühsymptom der Lues congenita.)** *Zeitschrift für Augenheilkunde*, Dezember, 1913.

(5) **Stephenson, Sydney.—The clinical pathology of syphilis of the eye.** *Medical Press and Circular*, June 24th, 1914.

(1) Under this heading, **Rollet**, of Lyons, gives the differential diagnosis between the ordinary hypopyon accompanying ulceration of the cornea, and that secondary to gumma of the iris, cornea, or ciliary region. The success of the treatment depends on the correctness of the diagnosis. In the absence of a corneal ulcer, a thick grumous, immobile hypopyon, with irregular outline, yellowish and streaked with blood-vessels or dotted with blood clots points to syphilitic pseudo-hypopyon. A general examination should be made. This pseudo-hypopyon, which consists of the *débris* of breaking down gumma, may be a secondary or tertiary manifestation. The treatment consists of mercury and potassium iodide. The pseudo-hypopyon should not be evacuated.

Gummatous infiltration of the cornea may be associated with this form of hypopyon, and the author relates a case to illustrate this.—The patient was a man of 54 years, treated in September with subconjunctival injections incision, and cauterisation ; progressive loss of vision was noted, followed by phthisis bulbi. In November the other eye became affected, a crescent of pus appeared in the anterior chamber, and yellowish filamentous streaks were seen in the upper part of the cornea. The patient gave a history of syphilis. 120 grains of potassium iodide were administered daily, and a third of a grain of the biniodide of mercury was injected into the gluteal region. There was rapid improvement of vision, which became practically normal.

P. A. HARRY.

(2) **Bruner,** of Cleveland, records a case of right-sided hemianopsia in a man of 34, who had had syphilis six years previously. The visual defect started as a scotoma in the nasal field of the left eye, but within three months it involved practically the whole nasal half of the left side and the temporal half of the right eye. Central vision was never appreciably affected, and the discs showed nothing beyond a doubtful haze and pallor. Under iodalbin, potassium iodide, and mercury, the fields recovered, and at the end of about seven months, the defects were reduced to a sector of the left lower nasal and an irregularly triangular scotoma in the right lower temporal fields. These scotomata have persisted practically unchanged ever since. There were no other cerebral or nervous symptoms.

J. JAMESON EVANS.

(3) **Fischer-Galati,** of Bucharest, describes a case of chancre of the upper lid. Only nine cases are recorded, but the reason for this is that few consider such cases worthy of publication. Primary sores of the eyelids are not uncommon. T. HARRISON BUTLER.

(4) **Mohr** and **Bech**, of Budapest, have examined 128 children under a year and a half old, sufferers from congenital syphilis, with a view to determining the frequency of optic neuritis. They found it to be present in 62 cases. In 19 cases the appearance of the discs was suspicious, and 47 children had normal discs. In the older children, aged from seven to twelve months, the papillitis disappeared in from three to four weeks. In the case of nurslings a few weeks old, the neuritis took seven months to clear up, although some of them received salvarsan. The youngest child examined was a week old, and had well-developed papillitis.

The authors confirm the statements of Japha and Heine, namely, that optic neuritis is a valuable sign of congenital syphilis. T. HARRISON BUTLER.

(5) **Stephenson,** of London, discussed the clinical pathology of syphilis of the eye in the course of a lecture given to the candidates for the diploma in Ophthalmology at Oxford.

The position in regard to syphilis has been changed by (1) the proof of the transmissibility of syphilis, (2) the discovery of the Spirochæta pallida, (3) the introduction of the Wassermann test, and (4) the use of salvarsan and neo-salvarsan. The Spirochæte can be found in all syphilitic lesions, and at all stages of the malady. The small numbers found in tertiary lesions explains the low infectivity of the latter. Noguchi's method of cultivating the organism is described, and the statement made that the Spirochæta pallida fulfills all Koch's postulates, and that there is not "the least doubt that it is the cause of syphilis." The histo-pathology is next dealt with, and a comparison made between syphilis and tubercle. Recent work has cleared up many of the mists of doubt which once enshrouded the pathology and treatment of interstitial keratitis. The work of Stargardt with trypanosomes has shown that it is the organism and not its toxins which produces keratitis. The relationship between syphilis and traumatic interstitial keratitis is clearly outlined and the experiments on animals in producing syphilitic keratitis are described. The *technique* of collecting material for the diagnostic demonstration of the Spirochæta pallida, and the various methods of recognising the organism under the microscope, are dealt with. The following axioms are laid down for the Wassermann test:—(1) A positive reaction is definite proof of syphilitic infection. (2) A negative Wassermann reaction does not prove the absence of syphilis. (3) Clinical signs being wanting, a positive Wassermann reaction justifies the employment of anti-spirillal remedies, and (4) Wassermann's original *technique* is more trustworthy than any of the modern substitutes for it. The control of treatment by the results of the Wassermann test is discussed. Noguchi's luetin reaction is described and compared with the von Pirquet reaction. Stephenson holds that it "is not likely to be of value in primary or secondary syphilis, but that it may possess considerable diagnostic value in tertiary cases which give a negative Wassermann reaction." The great advantage of the luetin test is its simplicity and the fact that it can be carried out by the surgeon, without laboratory assistance. Klausner's "Pallidin reaction" is said to be of great value in tertiary, and in inherited syphilis, but to be useless in tabes, general paralysis, and specific disease of the arteries.

Stephenson's paper shows a wide range of reading, and there must be very few who will not find it of value to them. Moreover, it is so clearly expressed and interestingly written that it can be read without the least effort.

VIII.—OPHTHALMIA NEONATORUM.

Holloway, T. B.—Ophthalmia neonatorum. *Ophthalmic Record*, December, 1913.

Holloway, of Philadelphia, is the member of the American Commission on the Conservation of Vision responsible for the report on ophthalmia neonatorum. He deals with the Ophthalmia Bill and the Midwives' Bill of Pennsylvania. The Ophthalmia Neonatorum Bill requires "that any physician, midwife, nurse, or other person having the care of an infant whose eyes have become inflamed or swollen or reddened, at any time within two weeks after birth, shall report the same in writing to the health authorities within six hours after the discovery thereof. Also, that every physician, within forty-eight hours after he ceases attention upon such a case, shall report the same to the Commissioner of Health, stating the condition of the infant's eyes."

The Midwifery Bill requires "that after January 5th, 1913, all midwives shall be required to possess a certificate from the Bureau of Medical Education and Licensure, and that this certificate shall be registered in the office of the prothonotary of the county in which the holder desires to practice midwifery."

The State of Massachusetts passed an ophthalmia law in 1905, but it seems to have been indifferently acted upon until 1910. At this time a physician was prosecuted by the Boston Board of Health, and a conviction obtained. Before the conviction the number of returns for the month had been but 10; the month after, the number was 20. The next month, there being no prosecutions, the number fell to 10; but as the result of new prosecutions, the numbers increased during the next four months to 15, 32, 97, and 116 respectively!

The writer does not discuss the *pros* and *cons* of compulsory prophylaxis, but states that owing to the increasing knowledge of the disease and all that it entails on the part of the public, he believes the time is coming "when the physician who fails to use some prophylactic measure, for fear of offending the moral sense of his patients, will have his timidity to thank for his humiliation when he is asked why the infant's eyes were not properly treated at the time of its birth."

As far as the general practitioner is concerned, prophylaxis against ophthalmia should begin during pregnancy, on lines generally laid down for the treatment of gonorrhœa in women.

The prophylaxis of ophthalmia in the infant is regarded as a duty of midwife and physician. It is even asserted that ophthalmia is as prevalent in the practices of some physicians as it is in those of midwives. Certain health authorities make a gratuitous distribution of prophylactics, and the midwives are instructed in the methods of using these remedies. The prophylactic remedy (to be used in the eye at birth), favoured by the writer, is a 1 per cent. solution of silver nitrate, although he also mentions protargol, argyrol and sophol, boric acid, bichloride of mercury (1 : 6,000 to 10,000), and permanganate of potassium (1 : 3,000 to 5,000).

In the matter of treatment he insists on the essential necessity of cleanliness, the avoidance of trauma of the cornea, and the necessity of daily observation. If the physician cannot safely and satisfactorily get a view of the cornea, an oculist should be immediately called in; his assistance is of much more value at that time than after perforation of the cornea and the loss of the eye. As to the institutional treatment of ophthalmia neonatorum, the Philadelphia hospitals have largely avoided the admission and treatment of these cases. The Philadelphia General Hospital, however, has always accepted ophthalmia cases, and a few of the other general hospitals accept them "on terms," but no accommodation is provided for them in the only hospital in Philadelphia devoted exclusively to disease of the eye.

The writer makes the following suggestions for rendering the ophthalmia and midwifery laws effective.—First, the laws must be rigidly enforced. Secondly, the free distribution of a prophylactic remedy and the training of midwives in its proper use. Thirdly, the establishment of the "follow-up" system. In this way the care of the cases reported could be supervised, the domestic conditions investigated, and appropriate action taken. The establishment of a municipal social service would be of the utmost value in assisting this work. Fourthly, make it mandatory to report all births within 12 hours, and upon receipt of this report forward to the parents printed instructions concerning ophthalmia neonatorum. This would serve the double purpose of being both practical and educational, Fifthly, that the city be divided into districts, and that the health authorities should make arrangements with ophthalmic staffs of the hospitals to supervise the treatment of appropriate cases that might develop in their particular districts. "This would place these cases under the observation of oculists, where I believe they belong." Sixthly, the provision of suitable hospital accommodation for those requiring such treatment. J. JAMESON EVANS.

IX.—FOREIGN BODIES.

(1) **Stieren, Edward.—The management of foreign bodies in the eye and orbit.** *Ophthalmic Record*, September, 1913.

(2) **Mellinghoff, R.—A further contribution regarding the condition of the lens after injury by particles of iron. (Ein weiter Beitrag zur Verhalten der Linse nach Eisensplitterverletzung.)** *Klin. Monatsbl. f. Augenheilkunde*, Dezember, 1913.

(3) **Paderstein, R.**—The literature concerning iron particles in the transparent lens. (Zur Literatur der Eisensplitter in durchsichtiger Linse.) *Klin. Monatsbl. f. Augenheilkunde*, Dezember, 1913.

(4) **Sweet, W. M.**—Fourth series of cases of injuries from foreign bodies examined by the Röntgen rays, with results of operation. *Ophthalmology*, January, 1914.

(5) **Lawford, J. B.**—Foreign body (metallic) embedded in the retina twenty-two months. Peculiar changes in the retina around the chip of metal. *Trans. Ophth. Society U.K.*, Vol. XXXIV, 1914, p. 192.

(6) **Oliver, M. W. B.**—Ruptured choroid due to injury by pellet from an air gun. *Trans. Ophth. Society U.K.*, Vol. XXXIV, 1914, p. 193.

(1) **Stieren,** of Pittsburg, after an experience of sixteen years' duration, gives some sound advice on the management of foreign bodies in the eye and orbit.

Foreign bodies in the anterior chamber or imbedded in the iris are best removed by forceps through a peripheral section with iridectomy, when necessary. This method gives better results than the use of the electro-magnet.

In cases of injury to the lens, he "proceeds at once to a corneal section and evacuation of the lens matter as completely as the circumstances of the injury permit." Experience has taught him that thick leathery membranes are too prone to develop where the slower and less risky method of needling or spontaneous absorption is adopted. This dogma he applies to the cases of traumatic cataract, irrespective of age of patient or position of foreign body.

With regard to foreign bodies in the vitreous, he has "reached that decided state of mind that he will never again attempt the removal of magnetic foreign bodies by way of the anterior chamber," Given accurate localisation by X-rays, he finds that a foreign body in the vitreous can be removed with much less damage to the eye, by inserting the cone-shaped tip of the magnet in the scleral wound of entrance, or one made with a sharp cataract knife at a point as near as possible opposite the foreign body, than by dragging the fragment through lens or ligament, iris or ciliary body, into the anterior chamber. Foreign bodies in the orbit need not be disturbed if they are of steel or lead. Copper and brass, glass and wood, are apt to be troublesome. Unless there is urgent demand for its removal, the foreign body is best allowed to remain in the orbit owing to the difficulty of finding it, even when localised, and the possibility of damage to muscles, nerves, or vessels in the search for it. When absolutely necessary, such a search is better done by a free incision through the palpebral skin, rather than through the conjunctival fornix which gives but a limited field in which to work. J. JAMESON EVANS.

(2) **Mellinghoff**, of Düsseldorf, reports a case in which, six-and-a-half hours after injury, a very small chip of iron was removed from the lens by means of a hand magnet. For nearly six months the lens remained clear, and then in a short time, became totally opaque. Had the case been reported at an earlier date, it might have been looked upon as an example of the lens remaining clear after removal of a metal particle. As it turned out, the case shared the usual fate of such injuries, and supports the view that a period of two years should elapse before it can be claimed that the lens has remained permanently clear after removal of a particle of iron. There is no obvious explanation of the rapid onset of the opacity after a long period of quiescence. It is suggested that there may have been some iron salts left behind which slowly acted upon the lens substance. A. J. BALLANTYNE.

(3) **Paderstein,** of Berlin, disputes the correctness of Elschnig's view that it has not been proved that a chip of iron can remain permanently in the lens without causing cataract, and that the permanent absence of cataract can only occur when the chip of iron lies on the anterior capsule or embedded in proliferated capsular epithelium. A. J. BALLANTYNE.

(4) This article, by **Sweet,** of Philadelphia, is a valuable contribution to the subject of eye injuries from metallic foreign bodies.

It reviews the more important facts with regard to three series of cases already published by the same author, and adds a further series of 280 cases, making in all 982 cases. In all these cases treatment was preceded by the taking of radiograms, to ascertain the presence or position of the foreign body. Details are given regarding the situation of the injury, the nature of the foreign body, the eye injured, etc., but most important are the records of ultimate results. Information is given regarding the cases of the present series after periods of observation varying from one month to four years. Of the cases belonging to the former series he has been able to obtain up-to-date information regarding sixty-one, and many of these have been seen as long as thirteen years after the accident.

The statistical character of the paper makes it unsuitable for abstract, but the material contained in it is worthy of study. A. J. BALLANTYNE.

(5) The peculiar changes found in the retina around a chip of iron or steel are described by **Lawford**, of London, as follows.—On the temporal side of the injured eye was a large detachment of the retina, which showed a rippled surface and which was best seen with a *plus* 5·5 D. spherical lens, "The detached portion was opaque, and on it, near the equator outwards, could be seen a dark grey spot surrounded by a ring, which had a bright golden colour. and was very luminous." Just beyond the latter some of the retinal arteries showed marked thickening of their coats. When first seen, V. of the affected eye was 5/60. During the twelve months the patient was kept under observation, the detachment of the retina became somewhat larger, and V. sank to hand-movements. SYDNEY STEPHENSON.

X.—FIELDS OF VISION.

(1) **Szily, Aurel v.—Ring scotoma originating in the blind spot (so-called Bjerrum's sign) in cerebral choked disc. [Von dem blinden Fleck ausgehendes Ringskotom (sog. Bjerrumsches Zeichen) bei Zerebraler Stauungspapille.]** *Klin. Monatsbl. f. Augenheilkunde*, Februar, 1913.

(2) **Peter, Luther C.—Altitudinal hemianopsia, unilateral and bilateral. Reports of cases.** *Ophthalmology*, April, 1913.

(3) **Fridenberg, Percy.—Central scotoma and blind spot anomalies; their clinical significance.** *Ophthalmology*, July, 1913.

(4) **Traquair, H. M.—Contribution to the study of bitemporal hemiopia.** *Edinburgh Medical Journal*, September, 1913.

(5) **Rübel, Eugen.—Hemianopic ring scotoma (incomplete bilateral hemianopsia.) [Hemianopisches Ringskotom. (Unvollständige doppelseitige Hemianopsie.)]** *Klin. Monatsbl. f. Augenheilkunde*, Dezember, 1913.

(1) Bjerrum's sign, a scotoma beginning at the blind spot, and gradually encircling the fixation spot, when first described, was supposed to be characteristic of the glaucomatous field. It has since been found in some cases of neuritis, resulting from disease of the accessory nasal sinuses, but has not hitherto been seen in a case of choked disc of cerebral origin.

Szily, of Freiburg i. B., describes such a case, illustrating his account with a number of charts. Among other things, he discusses the relative values of ordinary perimetry, of Bjerrum's method, of Priestley Smith's scotometer, and of a new method devised by himself, in which a screen of ground glass is placed between the patient and the source of light, the field being mapped out by means of small opaque objects moved over the back of the screen.* In all cases of choked disc of cerebral origin, the state of the vision and of the visual field must be taken into account in deciding as to the advisability of some decompressive operation. The author believes that the scotoma referred to should be added to the other positive indications for operation. It must be looked for by Bjerrum's or by some similar method, since it may, as the tests in this case clearly show, be overlooked if the ordinary perimeter is employed. A. J. BALLANTYNE.

(2) **Peter**, of Philadelphia, reports two interesting cases.—The first was a young woman who gave a history of sudden blindness occurring in the left eye twelve years ago, followed by recovery of sight in the lower half of her field of vision in the course of a few weeks. The light reaction of the pupil was deficient on illumination of the lower half of the retina (incomplete Wernicke sign). Ophthalmoscopically, the lower half of the disc was grey, and there was atrophy of the vessels passing downwards from the disc. The perimeter showed preservation of the lower half of the field of vision, its upper limit being a horizontal line above the fixation point. Central vision was 20/12 in each eye. *Diagnosis*: Embolism of central retinal artery, with restoration of circulation in the upper branches of the vessel.

The history of the second case, also a woman, begins with a number of vague symptoms supposed to be neurasthenic. Then she developed a paralysis of the left external rectus, which recovered under mercurial inunction. Four months later, a growth, labelled syphilitic, was removed from the septum of the nose. After an interval of two years, there was sudden loss of vision in the upper part of the field in both eyes, and at the same time numbness of the left side of the face and of the left hand and arm, and some mental disturbance. The perimeter confirmed the great contraction of the upper fields, which increased and was accompanied a few months later, by central scotoma in each eye. At the same time there were symptoms pointing to cerebral syphilis. There was some pallor of the lower half of each disc. The corrected V.A. at the date of reporting, eight years from the commencement of the history, was 20/30 and 20/20. The lower half of each disc was pale, and there was blurring of the retina and of the border of the upper half of each disc. The hemianopsia was still present, but there were no scotomata.

Although there was no positive evidence of syphilitic infection, the diagnosis was made of a syphilitic lesion affecting the under surface of the chiasma, leading to neuritis and partial atrophy. A. J. BALLANTYNE.

(3) In the course of his paper, **Fridenberg**, of New York, expresses the opinion that it is good practice to open the sphenoid sinus in cases of optic neuritis or choked disc showing paracentral scotoma ; indeed, he would go so far as to advise the same procedure, or at least the opening of the

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* A very similar appliance was devised by Robert W. Doyne several years ago.—EDITOR

ostium sufficiently to allow drainage and *lavage*, in all cases of blind spot enlargement, central scotoma, or other visual field defect of indeterminate origin, even in the absence of choked disc or neuritis, after the exclusion of tobacco, alcohol, and other likely causes.

Retrobulbar neuritis with ring scotoma has been found in cases of neurasthenia and hysteria. The author is inclined to question whether disease of the accessory sinuses was not answerable for both the general and the local symptoms in some of these cases. A. J. BALLANTYNE.

(4) The conclusions reached by **Traquair**, of Edinburgh, are as follows :—

1. Bitemporal hemiopia is much more common than present statistics show.
2. The frequency with which it is found depends upon the method of examination used.
3. The use of small objects and of Bjerrum's method is essential.
4. There are two chief types of bitemporal hemiopia.
5. The scotomatous type is characterised by early loss of direct vision. Typical cases show regular progression of the defect around the fixation point. This field is associated with active lesions, or lesions active during the presence of the scotoma.
6. The non-scotomatous type is associated with good vision for a long time.

The field changes occur slowly, affecting the quadrants in the same sequence, the defect diminishing in intensity from periphery to centre.

SYDNEY STEPHENSON.

(5) **Rübel,** of Freiburg, records the following case.—A man, 38 years of age, after a second attack of acute rheumatism, suffered from severe headache and transient loss of consciousness, accompanied by defect in each visual field to the right side. The latter persisted after the other symptoms had passed off. Two years later there was again an attack of headache and loss of consciousness, accompanied this time by loss of speech which recovered in four or five days. Again after two months there was a somewhat similar attack, but with complete blindness. Central vision recovered to its original condition, but there was loss of the power of orientation, which lasted for a week. Examination showed that the fundus was normal. Central vision was 6/6 and correspondingly good for near. In the fields of vision there was normal vision in the immediate neighbourhood of the fixation point, but this was surrounded by a broad absolute scotoma for white and colours. The extreme periphery of the fields was partly preserved. Albuminuria was the only discoverable sign of general disease.

In the course of seventeen months' observation, no change occurred in the fundi or in the fields of vision. Functional nervous disease being excluded, the author arrives at the conclusion that the primary affection was nephritis, leading to a series of apoplectic attacks, one of which caused a permanent right hemianopsia and another, twelve years later, left hemianopsia. To the field defect resulting from the double affection he gives the name of "hemianopic ring scotoma." The lesion would be in or near the visual cortex.

A. J. BALLANTYNE.

XI.—RETINITIS WITH MASSIVE EXUDATION.

(1) **Darier, A.—Retinal angiomatosis (von Hippel's disease). [Angiomatose rétinienne (maladie de v. Hippel).]** *La Clinique Ophtalmologique*, 10 décembre, 1913.

(2) **Friedenwald, Harry.—Retinitis with massive exudation.** *Transactions American Ophthalmological Society*, Vol. XIII, Part iii, 1914, p. 819.

(1) In this article, **Darier**, of Paris, goes back on a case of his own published in 1890. This case had evidently proved puzzling at the time to Darier and to others, and had been diagnosed tentatively by Darier as an aneurism, or as a tubercular tumour complicated by retinitis proliferans. In the light of present knowledge, he thinks it should be considered as one of the type described by Goldzieher and v. Hippel as retinal angiomatosis. A number of very interesting fundus drawings from this case, and also from those of other authors, are reproduced, and the symptoms, diagnosis, and prognosis of this very rare condition are discussed. The article should be read in the original. ERNEST THOMSON.

(2) This elaborate monograph, dealing with "Retinitis with massive exudation," by **H. Friedenwald**, of Baltimore, occupies thirty pages of the *Transactions*, and is illustrated by five reproductions of fields of vision, seven black-and-white drawings, and a couple of coloured plates.

The cases described by the author may be given in abstract as follows :—

1. A male patient, aged 18 years, noticed "spots" before his left eye about a month after recovery from typhoid fever. Some two years later, Friedenwald found retinitis of the left eye of so extensive a nature that the macular region alone remained relatively unaffected. There were numerous small peripheral hæmorrhages. Two prominent masses were present, one in the upper and the other in the lower part of the fundus. They were of whitish appearance, and covered with blood-vessels and numerous spots of hæmorrhage. There was, however, no detachment. Just below the optic disc was a large "snow field" of exudation, which extended around the nasal side to above the disc. The retinal arteries in the affected regions showed abundant sclerotic changes, and here and there were converted into fine threads. There were fine vitreous opacities and keratitic deposits. V.=6/30.

The condition of the eye became worse, and was complicated with occasional attacks of high tension and pain. Finally, secondary cataract developed. Eventually the eye was removed, some twenty-eight months after the patient was first seen, and about four years and four months after the disease commenced.

An elaborate pathological report on the eye, by Verhoeff, of Boston, is appended. It must here suffice to quote the pathological diagnosis : "Obstruction of central retinal artery and vein, due to proliferative endovasculitis. Marked degeneration of retinal vessels. Advanced atrophy and degeneration of retina. Complete occlusion of filtration angle. Advanced secondary glaucoma."

2. A married woman, about 22 years of age, who had been affected with syphilis, gave a history that both eyes had been inflamed some three years before she was seen by Friedenwald. The right eye was "blind" from convergent strabismus, and, eight months prior to the author's examination, had been operated upon elsewhere for cataract. On admission, the right eye was rather congested, and did not possess even perception of light. The iris was *bombé*, the pupil was irregular, and filled with a cataractous mass, the iris was discoloured, the anterior chamber was shallow, and tension was normal. Extraction of the capsular cataract was speedily followed by blocking of the pupillary aperture, and it was never possible to inspect the interior of the eye.

Meanwhile, the patient complained of the other (left) eye, which, upon examination, was found to present in the lower and inner part of the retina an extensive white lesion, crossed by tortuous and markedly enlarged retinal vessels. A large bluish (?) neoplasm lay towards its centre. As the injection of tuberculin produced general reaction, tuberculin treatment was tried, but ineffectually. Mercury and iodide were next given, but with no success. Central vision (at first unaffected) gradually failed, and the visual field became smaller by more or less sudden encroachments. Hæmorrhages were observed in various parts of the fundus. Some eight months after the condition was first discovered, V. = 16/20 (with difficulty). Fine vitreous opacities. The neoplasm (?) mentioned above could be seen with a *plus* 12 D. spherical lens. Dull constant pain set in, and vision fell to hand-movements at two feet. The entire fundus became involved by the changes. Vitreous opacities. A detachment of the retina made its appearance. Up to the time of writing, the condition has remained without alteration.

The patient's right eye was enucleated, and examined pathologically by Standish McCleary. It was found to contain bone. A mass of inflammatory exudate was present in the vitreous chamber, and this showed blood-vessels in all stages of development. The question of neoplasm *v.* organising inflammatory exudation was raised, and decided in favour of the latter alternative.

Friedenwald thinks that the retinal affection found ophthalmoscopically in the left eye was similar to that found pathologically in the eye that had been removed (right), and that both depended upon syphilis.

3. This was a case of detachment of the retina and neuro-retinitis, with development of capillary blood-vessels in a child, aged 11 years, affected with renal disease. It is reported merely to draw attention to the similarity of the ophthalmoscopic appearances to those of a case of retinitis with massive exudation.

4. In one eye of a child, aged four years, the entire central region was found converted into an intensely white surface, while later there were vascular changes in the shape of masses of minute vessels and hæmorrhages towards the periphery of the fundus, and a number of crystals made their appearance over the white *plaque* in the retina. Case still under observation.

5. A man, aged 17 years, suddenly found that he had lost the sight of the right eye. That eye showed marked arterial and venous changes, and retinal degeneration, the chief foci of which were grouped along the sweep of the retinal vessels as they passed from the optic disc to reach their ultimate distribution.

The retina was detached in those places, and could be seen with a *plus* 8 D. spherical lens. Vitreous opacities. In short, this was an instance of v. Hippel's disease. SYDNEY STEPHENSON.

XII.—OPERATIONS.

1. Cataract.

(1) **Wandless, Henry W.—A new procedure in cataract extraction, a subconjunctival-flap method of capsulotomy.** *Archives of Ophthalmology*, September, 1914.

(2) **Knapp, Arnold.—Report of a series of extractions of cataract in the capsule after subluxation with the capsule forceps.** *Trans. Amer. Ophth. Society*, Vol. XIII, Part iii, p. 666, 1914.

(3) **Hansell, Howard F., and Shannon, C. E. G.**—Preliminary capsulotomy in the operation for the extraction of immature cataract. *Ibidem*, p. 678.

(4) **Maddox, E. E.**—A traction string for intra-capsular extraction of cataract. *Transactions Ophthalmological Society U.K.*, Vol. XXXIV, 1914.

(5) **Nesfield, Captain I.M.S.**—The clear pupil after cataract. *Indian Medical Gazette*, Vol. XLIX., p. 345, September, 1914.

(1) **Wandless**, of New York, performs the capsulotomy step of a cataract extraction by introducing a special curved needle, sub-conjunctivally, before performing the corneal section. He lays stress on the importance of performing the combined operation, in order that the capsulotomy may be carried upwards from its central area to the upper margin of the lens. He claims that this latter manœuvre greatly facilitates the escape of the lens, and so lessens the risks of vitreous loss. R. H. ELLIOT.

(2) **Knapp**, of New York City, has developed a method of extracting cataract in the capsule, after partial dislocation of the lens, which is said to entail no greater risk than the ordinary operation. It bears a very close resemblance to Stanculeanu's method, although Knapp claims that he devised and practised it nearly a year before Stanculeanu wrote. The operation can unfortunately be carried out only in from 40 per cent. to 50 per cent. of the patients. Knapp's *technique* is briefly as under:

The Koster speculum is introduced, and a section, provided with a conjunctival flap, involving almost half the corneal circumference, is made. After iridectomy has been performed, Kalt's capsule forceps are made to grasp a knuckle of capsule at a point somewhat below the centre of the pupil, and by slight rocking movements, the cataract is sub-luxated, when pressure straight back upon the lower part of the cornea with Smith's hook causes the lens to turn a somersault and to be delivered, as it were, feet first. In the contrary event, that is to say, when the capsule tears after the forceps have been applied, a large piece of the capsule is obtained, and the operation then follows the conventional lines.

The results obtained by Knapp since February 9th, 1910, by the method outlined in ninety-four extractions of cataract in the capsule are set forth below:

Summary.

Mature 57; hypermature 23; immature 14.

Visual results: 20/15, 5; 20/20, 17: 20/20,–, 8; 20/30, 24; 20/40, 11; 20/50, 7; 20/70, 13; 20/200, 2; fingers, 4; projection faulty, 2; total loss, 1.

Prolapse of vitreous: 15. The slightest loss of vitreous is counted; usually very small in amount; decided loss in 1 only.

Visual results of this group: 20/20, 1; 20/30, 6; 20/40, 2; 20/50, 1 (traumatic cataract); 20/70, 4 (2 mac. corneæ); 5/200, 1 (myop. mac. corneæ).

Capsule ruptured during extraction, separately extracted, 5.

Iridocyclitis: 8; Iritis, 5; Cyclitis, 3.

Prolapse of iris: 6 (including incarceration).

Detachment choroid (transient), 2.

Hæmorrhage in retina and vitreous: 3 (1 of these traumatic).

Retrochoroidal hæmorrhage: 1.

Uncomplicated: 70.

Complicated: 24.

Dystrophia corn. epithel.	1
Mac. corneæ	3
Central chorioretinal changes	6
Optic atrophy	1
Glaucoma (previous)...	3
Detachment retina	1
Hæmorrhage	1
Myopia (choroidal changes)	4
Opac. vitr. (old)	4

Of the 70, 63 obtained vision 20/15 to 20/40, 90 per cent.
2 ,, ,, 20/50
4 ,, ,, 20/70

Projection faulty, 1 (iridocyclitis, in diabetic subject with 8 per cent. sugar, acetone and diacetic acid). SYDNEY STEPHENSON.

(3) **Hansell** and **Shannon,** of Philadelphia, have tried the Homer C. Smith preliminary capsulotomy in the operation for immature cataract in some fifteen or more cases. The Smith directions, however, were not carried out in their entirety. For example, the interval between the capsulotomy and the extraction was extended from six to twenty-four hours; in all but three instances the Knapp knife-needle or the Ziegler instrument was employed instead of Smith's knife; and, lastly, the discission was V-shaped rather than crucial, as advised by Smith. With regard to results, in most cases the lens failed to come away complete, and it was necessary to remove the cortical remains by irrigation or subsequent operation. It would seem that the operation, while it perhaps presents no outstanding advantages over more widely known and extensively practised procedures, may be of service to some patients "who require relief from the delay of immature cataract." That Homer C. Smith obtained such uniformly good results in thirty cases makes the authors feel that the operation is worthy of further trial.

SYDNEY STEPHENSON.

(4) **Maddox**, of Bournemouth, has employed what he describes as a "traction string" to enable the wound toilet, in intra-capsular cataract extraction, to be made in the open instead of under the tent-like upper lid. After the introduction of the speculum, "a linen thread was passed horizontally through 3 or 4 millimetres of episcleral tissue at the insertion of the superior rectus tendon; its two ends were then placed together over the temple, so as to be out of the way, and not interfere with the removal of the speculum later. After the extraction of the encapsuled lens, the eye was drawn down just sufficiently by the string to allow the toilet to be effected in full view without the slightest tendency to open the wound." Maddox shows by a diagram how the pull must be made parallel with the belly of the rectus. If the pull be at a higher angle the wound tends to gape. If at a lower angle there is a tendency to raise the intra-ocular pressure. As soon as the operation is completed, the suture is withdrawn after cutting one of its two halves close to the eyelashes. The author briefly reviews the respective merits of the intra-capsular and of the ordinary simple extraction.

ERNEST THOMSON.

(5) **Captain Nesfield** finds that on a bright day in India the glare of the sun is much less trying to an eye with dilated pupil and normal refraction if a 10 D. spherical lens be placed before the eye. Thus he explains the fact that but few out-of-door workers in India apply for spectacles after Smith's intra-capsular extraction has been performed upon their eyes. Owing to the

combined iridectomy, there is trouble from glare through the coloboma and wide pupil. And this trouble is much intensified if the refraction of the aphakic eye be corrected, focussing light on the more sensitive area of the retina. The patients prefer to reduce this dazzling by keeping the refraction uncorrected.

Thus the provision of a clear pupil is only "half the battle" in India. There a round, actively mobile pupil is very strongly needed. Hence, the advantage of the operation revived by Nesfield (reviewed in THE OPHTHALMOSCOPE on three occasions), dividing the zonule below the lens. Intra-capsular extraction is then easy without iridectomy. A small basal buttonhole is, however, made in the iris (before expression of the lens), to guard against subsequent prolapse. As formerly reported, losses of vitreous occur only in about 2 per cent. of the operations. H. HERBERT.

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2. Sclerectomy.

(1) Griffith, A. Hill.—Note on Elliot's operation. *Ophthalmic Review* January, 1914.

(2) Bachstez, E.—Inflammation of the flap after Elliot's trephining operation. (Eine Lappenentzündung nach Elliotscher Trepanation.) *Klin. Monatsbl. f. Augenheilkunde*, Januar, 1914.

(3) Meller, J. — Lagrange's sclerectomy and Elliot's trephining operation. (Ueber die Sklerektomie nach Lagrange und die Trepanation nach Elliot.) *Klin. Monatsbl. f. Augenheilkunde*, Januar, 1914.

(4) Elliot, R. H. — Corneo-scleral trephining. *Ophthalmic Review*, February, 1914.

(5) Paderstein.—Upon the technique of and indications for the Elliot operation. (Zur Technik und Indikation der Elliotschen Operation.) *Zeitschrift für Augenheilkunde*, Februar, 1914.

(6) Deutschmann, R.—Inflammation of the flap after Elliot's trephining. (Lappenentzündung nach Elliotscher Trepanation.) Deutschmann's *Beiträge zur Augenheilkunde*, Heft lxxxvii, April, 1914.

(7) Lagrange. — An open letter to Professor Sattler, of Leipzig. (Lettre ouverte à M. le Professeur Sattler, de Leipzig.) *La Clinique Ophtalmologique*, 10 mai, 1914.

(8) Morax, V. and Fourrière, A.—The surgical treatment of chronic glaucoma. (Le traitement chirurgical du glaucome chronique.) *Ann. d'Oculistique*, mai, 1914.

(9) Tiffany, Flavel B.—Elliot's trephining operation for glaucoma. *Medical Fortnightly*, May 25th, 1914.

(10) Rochon-Duvigneaud.—Contribution to the study of the results of corneo-scleral trephining with iridectomy. (Elliot's operation.) [Contribution à l'étude des résultats de la trépanation cornéo-sclérale avec iridectomie. (Procédé d'Elliot.)] *La Clinique Ophtalmologique*, 10 juillet, 1914.

(11) **Jacqueau.—Glaucoma two years after an operation for cataract. Iridectomy insufficient. Cure after sclerectomy. (Glaucoma deux ans après une opération de cataracte. Insuffisance de l'iridectomie. Guérison après sclérectomie.)** *La Clinique Ophtalmologique*, 10 juillet, 1914.

(12) **Parker, Walter R.—Report of a case of detachment of the retina, occurring in a case of neuro-retinitis, restored by scleral trephining operation, associated with incision of the choroid and retina. No recurrence after a period of eight months' time.** *Archives of Ophthalmology*, September, 1914, and *Trans. Amer. Ophth. Society*, Vol. XIII, Part iii, p. 661, 1914.

(13) **Quackenboss, Alex.—Sclero-corneal trephining for glaucoma. Complications and failures in one hundred cases.** *Trans. Amer. Ophth. Society*, Vol. XIII, Part iii, p. 632, 1914.

(14) **Standish, Myles.—Trephine operation for glaucoma. Late infection from an acute conjunctivitis.** *Ibidem*, p. 640.

(15) **Elliot, R. H. — The operation of sclero - corneal trephining, considered in relation to the principles which should guide an operator in the performance of a sclerectomy.** *Lancet*, October 3rd, 1914.

(1) **Griffith,** of Manchester, uses the trephine, without making a flap, dividing the conjunctiva at the corneal margin, and placing the instrument on the globe in such a way that the cutting circle is 1/3 on clear cornea. He makes an iridectomy, so that the pupil is pear-shaped. He closes the opening by a horizontal suture through the conjunctiva. A. H. PAYAN DAWNAY.

(2) **Bachstez,** of Vienna, performed trephining with peripheral iridectomy on the eye of a man 53 years of age. The operation and healing ran a normal course, resulting in the formation of a bleb-like elevation of the conjunctiva, with lowered tension. Seven weeks after the operation, there was complaint of pain in the eye, and the surgeon observed over the trephine hole a greyish, sharply-defined, oval swelling, 4 mm. by 2·5 mm. in diameter, lying tangential to the corneal border. It looked like a pustule, but the local injection was slight, the cornea was clear, and there was no change in the iris or anterior chamber. Incision showed the swelling to be solid, and a small piece, excised and examined microscopically, was found to consist of granulation tissue. The condition probably resulted from mechanical irritation. The trephining had been done below the cornea, and the part was subject to the friction of the lower lid margin.*

A. J. BALLANTYNE.

(3) In this lengthened paper **Meller,** of Vienna, reviews his own experience of these two operations for glaucoma. Lagrange's operation was done on 381 eyes, and these, at the time of writing, had been under observation for periods of from five years to three months. The material is analysed from various standpoints, taking note of the type of glaucoma, the height of the tension before operation, the variety of the cicatrix obtained, and the results. He found the losses to be greatest in cases of chronic glaucoma, and least in cases of glaucoma simplex. Thirteen eyes had to be enucleated at some period after the operation, and the histological conditions found in them are fully discussed. In no case was it found that the section had opened into the suprachoroidal space. He thinks that the division of the tendon of the ciliary muscle would involve the making of an impossibly peripheral incision,

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*For abstract of similar kind of case see (6) later, page 39.

the difficulty being, of course, enhanced by any peripheral adhesion of the iris to the cornea. He therefore cannot support Lagrange's assumption that he cuts the tendon, and so sets up a communication between the anterior chamber and the suprachoroidal space, nor does he think that the attainment of this has any bearing on the effect of the operation. His sections support the view that sclerectomy can produce fistulisation of the sclera, and that in a certain number of cases the fistula persists, but the existence of such a fistula is not the essential thing, for over it grows a connective tissue cap which again shuts the eyeball, and the success of the operation depends upon whether this connective tissue does or does not permit filtration. Clinically, 93 per cent. of the cases with an œdematous cicatrix show normalisation of tension, and the same thing occurs in 83 per cent. of cases presenting a flat cicatrix. The absence of harmony between the clinical appearance of the cicatrix and the mechanical result of the operation was well illustrated by a case in which both eyes were operated on. Three years later one eye presented a cystic cicatrix and had a tension of 30 mm. of Hg., while the other, with a flat cicatrix, had a tension of 10 mm. of Hg. It should be noted, however, that the eyes examined histologically were those in which the operation had not run its normal course.

Meller raises, in passing, the question whether very low tension in itself may not be injurious to the eye. Elliot claims to have seen no evil results, but Meller quotes several cases among those operated on by Lagrange's method which support the opposite view. In one case in which the affection of each eye was the same, one eye was operated on according to Lagrange, the result being that the tension remained at 5 mm. of Hg. and vision fell off to 6/36, while the other eye, in which an iridectomy was performed, had retained 6/6 vision two and a half years later, the tension being 20 mm. of Hg.

Meller's experience of Elliot's operation is derived from 178 operations on 169 eyes. Since the great majority of these have been under observation only for a few months and none for longer than a year, it may be doubted whether they can be taken as a basis for a useful comparison of the two operative procedures. Two of the eyes subsequently had to be enucleated, and he also obtained the eyes from a patient who died a month after operation. On technical grounds, Elliot's operation has the advantage that it is easier to perform, while Lagrange's operation presents a greater possibility of regulating the size of the wound and the amount of sclera excised. By statistical methods, the author arrives at the conclusion that Elliot's operation gives as good a chance of reaching a good result, while the danger of such complications as expulsive hæmorrhage, etc., is only a third of that shown by Lagrange's operation. The recurrence of high tension after Elliot's operation was found to bear a close relation to the treatment of the iris. It occurred most often when the iris was not touched, less frequently when a peripheral incision was made in the iris, and least often when total iridectomy was added. Hence, Meller lays greater stress on the performance of iridectomy than do the designers of these operations.

A. J. BALLANTYNE.

(4) In this paper **Elliot,** of London, advocates the use of a trephine of not less than 2mm. diameter, so as to avoid trouble in dealing with the iris. In making the scleral section, the front part should be cut through, leaving the small disc attached posteriorly ; the iris and disc should be grasped together and be cut off, the iridectomy being peripheral only, so that the sphincter iridis is not interfered with. The trephine hole should be well forward in the cornea, and the conjunctival flap large. This last point is of great importance in avoiding possible sepsis and the blockage of the hole by down-growing

epithelium. He considers the method suggested by Hill Griffith of closing the conjunctiva by a stitch across the trephine hole as liable to encourage the filling of the hole by connective tissue. A. H. PAYAN DAWNAY.

(5) This paper by **Paderstein**, of Berlin, is interesting because he has performed the operation only eight times and recounts his failures. In the first case, although he tried to trephine as far forward as possible, he found that the resulting aperture was too peripheral. He had operated over the ciliary body. The aqueous did not run out, and he could not perform an iridectomy because of great pain. Finally, the ciliary body prolapsed, and the operation was a failure. He rightly says that it would not be just to blame the method when the operation had not been correctly performed. In another case he could not perform an iridectomy after the trephining, because his instruments appeared in the pupil behind the iris. He trephined in a second place with the same result. Obviously, there was a complete adhesion of the iris to the cornea, with obliteration of the irido-corneal angle. In a third case, a successful operation with combined iridectomy failed to reduce the tension to normal.

The author thinks that the iridectomy should be omitted :

(1) When it is impossible, or technically difficult, as when the anterior chamber is absent or very shallow.

(2) When iridectomy would be dangerous to the eye, as in buphthalmos or glaucoma associated with a dislocated lens.

(3) When iridectomy would necessitate general anæsthesia. He says that a surgeon who has had a death from chloroform will appreciate this objection.

Trephining is better than iridectomy in cases of absolute glaucoma, when a palliative operation takes the place of enucleation. Trephining is advantageous in cases where iridectomy with scleral section is generally useless, as in glaucoma simplex. This is the class of case where the new operation fills a hiatus in ophthalmic therapy. This statement can be criticised. Iridectomy is often perfectly satisfactory in glaucoma simplex, and as a prophylactic operation is considered by some surgeons to be safer and better than sclerectomy. The author asks the question, is trephining safe in cases where the field of vision approaches the fixation point? He notes that Stock has performed the operation combined with iridectomy upon a large number of these cases with conspicuous success. Paderstein recommends a small incision in the conjunctiva which does not demand a suture. He has devised a trephine of his own provided with a small stop disc.

The author says nothing about the necessity for " splitting " the cornea.

T. HARRISON BUTLER.

(6) **Deutschmann**, of Hamburg, performed a trephining operation combined with iridectomy in a case of chronic glaucoma. Lowering of tension resulted, with formation of a small conjunctival elevation. The patient reappeared ten months later complaining of pain in the eye, and there was found in the situation of the trephine opening, a thick, dirty-grey, conjunctival cushion, suggesting infection of the flap. The tension had risen again, but the appearances of the iris, etc., were satisfactory. There was found to be spastic entropion, the ciliary margin rubbing against the conjunctiva covering the trephine opening, and on the assumption that this had caused the trouble, the entropion was rectified by operation. Within a fortnight thereafter, the parts were normal and tension had fallen. Bachstez (*Klin. Monatsbl. f. Augenheilkunde,** Januar, 1914) had previously reported a case in which an appearance very suggestive of a pustule under the conjunctival flap turned out to be due to a solid thickening of the conjunctiva, produced in a somewhat similar way by the friction of the lid. A. J. BALLANTYNE.

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* For abstract, see (2), p. 37.

(7) **Lagrange**, of Bordeaux, writes to Sattler, once more impressing the claims of his operation over that of corneo-scleral trephining. S. E.

(8) **Morax** and **Fourrière**, of Paris, examine critically the results of the surgical treatment of chronic glaucoma, subacute glaucoma, and simple glaucoma at the Lariboisière hospital during the past eight years. They have already dealt with the results obtained in acute glaucoma, and propose to study those in secondary glaucoma in a future article.

The cases on which the article is based number 77, of which 37 occurred in males and 40 in females, while in acute glaucoma 47 out of 56 cases occurred in females. The age of the patients varied from 30 to 75 years, but 57 out of the 77 cases occurred between the ages of 50 and 70. The disease was bilateral in all but 14 cases, and even in these latter it could not be definitely stated that the second eye remained permanently unaffected. As a rule, local anæsthesia (instillations of novocain and cocain, with subconjunctival injections of cocain) was found to be sufficient ; but when the eye showed manifest symptoms of irritability, an orbital injection of cocain was added, and 14 out of 100 operations were done under chloroform anæsthesia. The operations performed were iridectomy on 23 eyes, and sclerecto-iridectomy on 83. No remarks are made on the *technique* of iridectomy. In the earlier operations sclerecto-iridectomy was performed by Lagrange's method ; but later, owing to the danger of rather large incisions with a Graefe knife, Holth's modification was adopted, and, finally, after May, 1912, a certain number of cases were trephined "following the *technique* of Freeland Fergus and Elliot." The immediate complications recorded were : (1) loss of vitreous one case (due to too large a scleral incision, eye saved with V. 5/38 and filtering cicatrix) ; (2) expulsion of lens with loss of vitreous in eye with tension 82 mm. Hg. Result, eye blind with T. 35 mm. Hg.; (3) expulsive hæmorrhage with atrophy of globe. The second eye of this patient developed glaucoma, which was treated by iridectomy; but the tension remained high, and there was an intra-ocular hæmorrhage which reduced the vision to counting fingers. A posterior sclerotomy was performed, and the hæmorrhage cleared up, leaving V. 5/5. For three years the vision varied between 5/5 and 5/7·5, and the tension between 25 mm. and 32 mm. Hg., but, in spite of the use of myotics, the tension then rose to 57 mm. Hg., and the sight became misty. A trephine operation was performed, with the result that a cystoid scar formed, the tension was reduced to 6 mm., and the vision became normal. Eighteen months later, the vision was normal, the tension was 22 mm. Hg., and there was no sign of obliteration of the cystoid cicatrix.

The post-operative complications are divided into early and late. The former comprised one inversion of the conjunctival flap, one hyphæma lasting twenty days, one hyphæma occurring on the seventeenth day, and some cases of unusual degree of pain. Sclerecto-iridectomy is frequently followed by severer pain than is usual in other intraocular operations, and a series of cases was watched, with a view to making a comparison between the amount of pain caused by the various methods of performing it, with the following result.—In fifteen typical Lagrange operations there was only one with exceptional pain, but this persisted for several weeks. In seven Holth operations six were quite painless, but the seventh had some pain on the third day, which quickly passed off. In twenty-four trephine operations pain was noted in ten cases, often sufficiently severe to prevent sleep on the night following the operation, in spite of the exhibition of acetyl-salicylic acid. This usually ceased on the day after the operation, and never lasted longer than the second day.

The late complications apart from return of tension, were.—(1) Late infection of the fistulous opening in two cases, one with incarceration of iris in angle of wound after a large iridectomy, an attempt having been made to remove a scleral wedge, which was unsuccessful owing to blunt scissors, and the other after trephining ; (2) Late hæmorrhage in the vitreous, two cases ; one three months and the other twelve-and-a-half months after the operation. Both recovered with satisfactory vision. (3) Post-operative opacification of the centre of the cornea, one case. The re-establishment of the anterior chamber after sclerecto-iridectomy took place after periods varying from one to sixteen days, but, on the whole, it was slower after trephining than after Lagrange's or Holth's operation. The authors consider that slowness in the re-establishment of the anterior chamber is of good prognosis for the formation of a cystoid cicatrix and its favourable action on the tension. The effect of the various operations on the tension was as follows: (1) *Iridectomy.*—Hypertension returned more or less rapidly in the greater number of the twenty-three cases. In five cases in which tonometric examinations were made, three had hypertension while in the other two there were small incarcerations of the iris causing cystoid cicatrices. (2) *Lagrange-Holth operations.* — In twenty-two out of twenty-four cases observed tonometrically the tension remained below 27 mm. and in several instances it was low one or even two years after operation. (3) *Trephining.*—In seventeen out of twenty-one cases, the tension was between 14 mm. and 25 mm. Hg. from four to eight months after the operation. It was found that in some cases the filtration persisted for years, while in others it ceased much sooner. When a fistula is going to disappear, it first widens, then becomes flat, and finally all trace of supplementary vascularisation disappears. Although the presence of scleral fistulisation coincided in some cases with a return of the tension to normal, there were other cases in which hypertension persisted or returned in spite of the existence of a cystoid cicatrix.

The results with regard to central vision obtained by both the Lagrange operation and trephining in cases under observation were satisfactory. Some patients had a reduction of from 1/10 to 2/10 in vision, while others had a notable and permanent improvement. The rapid and permanent loss which used to be dreaded in patients with very contracted visual fields was never experienced, although operations were performed on a number of such cases. In spite of the difficulty in following patients long enough to get reliable statistics and the notoriously deceptive nature of the results of treatment in chronic glaucoma, the authors consider that they are justified in concluding that the addition of scleral resection to iridectomy, and the consequent creation of a fistulous cicatrix, has manifestly improved the results obtained in the treatment of the disease, and that in spite of the operation and post-operative complications to which the operation is liable, it is fortunate that we possess a means of relieving for a longer or shorter time the grave functional troubles due to hypertension. R. J. COULTER.

(9) **Tiffany**, of Kansas City, who has learnt Elliot's operation, in the course of a world-tour, from Fuchs, von Grósz, and ophthalmic surgeons in the Orient, considers it to be "the operation *par excellence*, not only for glaucoma, but also for the prevention of hernia after the extraction of cataract, and for detached retina." He describes his *technique*, and gives notes of his cases, one of which was an acute one. His results have been excellent. SYDNEY STEPHENSON.

(10) This article, by **Rochon-Duvigneaud**, of Paris, is a commendably business-like synopsis of his results of trephining. He has performed fifty-six trephinings on very diverse kinds of glaucoma. Credit for the *method* of operating is given to Lagrange, for this *variety* of the method to Elliot.

The author gives as his reasons for trying the operation on a number of cases (one judges to the exclusion *pro tem.* of all other glaucoma operations), that it is "easy, without danger, and always the same," an opinion with which all will not agree.

In chronic simple glaucoma of sixteen eyes, the progress of which could be followed out, the tension became normal or subnormal in twelve—about 70 per cent.

In chronic simple glaucoma with exacerbations, the result was good four times (? five times) out of ten eyes. The tension in these varied from 2·5 mm. to 25 mm.

In two cases of acute glaucoma a perfect cure resulted, but the author gives the whole credit to the iridectomy, because there was no appearance of filtration : the opening seemed to become completely obliterated.

In eleven cases of secondary glaucoma there was only one good result. This was a case of seclusio pupillæ where iridectomy had failed to reduce tension. In this case the tension became 22mm. after trephining.

Throughout the article results are given in terms of tension only, not of visual acuity. It may be well to state the tensions in the cases of chronic simple glaucoma which did so well :

1. After six months, T. = 17.
2. After six months, Right T. = 12 ; Left T. = 16.
3. After six months, Right T. = 10 ; Left T. = 10.
4. After eight months, T. = 7.
5. After ten months, T. = 7.
6. After twelve months, T. = 20.
7. After fourteen months, Right T. = 15 ; Left T. = 10.
8. After eleven months, obvious hypotony (not tonometered).

ERNEST THOMSON.

(11) **Jacqueau,** of Lyons, in a case of glaucoma following simple extraction, although actually successful in curing the disease by his modification of Lagrange sclerectomy after iridectomy had failed, remarks that he is less enthusiastic about the method than formerly. In chronic glaucoma he has seen "trephining" fail in spite of obvious filtration, and in spite of the absence of raised tension ; the vision slowly deteriorating. On the other hand, he has seen relatively good results from simple iridectomy. In most cases Jacqueau considers that iridectomy should be done first of all. If it fails, then sclerectomy may be useful.

For Jacqueau's method of operating consult *Soc. Française d'Ophtalmologie,* 1910, T. XXX, p. 186 (abstract in THE OPHTHALMOSCOPE, 1911, p. 142).

ERNEST THOMSON.

(12) **Parker,** of Detroit, Mich., has trephined three cases of retinal detachment, with a view to reduce the displacement. In the two previous instances he neglected to incise the choroid and retina, and the result was unsatisfactory. In this one he used a cataract knife to divide those coats, after completing the trephining ; a marked reaction followed, but at the end of ten days the retina was re-attached, and the vision eight months after operation had risen from 4/60 to 6/12. The visual field is now nearly normal.

A similarly successful case was published by Flavel B. Tiffany in the *Ophthalmic Record* for March, 1914. The latter operator removes a small portion of the choroid with scissors, after trephining in the usual way.

R. H. ELLIOT.

(13) This practical communication by **Quackenboss,** of Boston, Mass., deals with one hundred cases of trephining, mostly performed in accordance with

Elliot's method, that have come under the care of the staff of the Massachusetts Charitable Eye and Ear Infirmary.

The author believes that the operation is best adapted for chronic simple glaucoma. It is not difficult, and can be performed with little danger. A local anæsthetic was generally used, and adrenaline was employed to stop the bleeding. He recommends a 2mm. trephine, and mentions those that bear the names of Elliot, Stephenson, and Verhoeff respectively. In using Stephenson's instrument, he twists an elastic band around the handle, in order to prevent any tendency of the fingers to slip. Whenever possible, an iridectomy should form part of the operation. In most cases the button of sclera was removed with scissors. In a few instances the button came out on removal of the trephine, but in no case did it fall into the anterior chamber. Quackenboss recommends that the conjunctival flap should be kept in place by a single suture.

As regards complications, the author mentions two cases where the iris was caught in or forced through the trephine aperture. In three cases there was loss of vitreous. Quiet iritis, which occurred in a few cases, is the chief danger to be guarded against immediately after the operation. In a couple of cases in the series, there was severe irido-cyclitis, resulting in serious damage to the eye. Persistent low tension was met with once, in a man, forty-six years of age, where five months after trephining, the intra-ocular tension stood at 10 mm. of mercury. Separation of the choroid was noted once. Quackenboss regards late infection, of which he narrates a grave case, as "the only real danger to be feared from the operation." Three patients remained unrelieved by the operation. Of the six cases that came to enucleation, one was an instance of sarcoma of the choroid, one of choroidal hæmorrhage, and the rest were glaucomas of the hæmorrhagic type. The last case related is to illustrate one cause of failure, namely, wound of lens capsule and sub-luxation at the moment of operation, followed by blocking of the trephine hole by lens matter. SYDNEY STEPHENSON.

(14) After some abstract considerations as to the possible dangers that may follow the making of a permanent opening through the sclera, **Standish,** of Boston, Mass., records the following case. One eye of a man, 77 years of age, was treated by Elliot's method on December 17th, 1913. Iridectomy formed part of the operation. Tension was normalized, and V. of 20/100 obtained. Seen on February 26th following, with statement that the eye had been inflamed for five days. On examination, muco-purulent discharge, much congestion of conjunctiva, and the bleb over the trephine hole was of considerable size and filled with a solid yellow mass, and there was hypopyon. The conjunctivitis and the pus in the chamber disappeared in about ten days under treatment, but were succeeded by a low grade iritis, synechiæ, and deposits on anterior and posterior capsule of lens. The signs receded, but although tension remained normal, patient was left with vision so impaired that it was with difficulty that he could find his way about.

Standish concludes from this case that the danger of an intra-ocular infection from an acute conjunctivitis is great enough to compel us to warn all such patients that the matter is to be taken seriously and properly treated.
SYDNEY STEPHENSON.

(15) If one say that this paper by **Elliot,** of London, intended to be read at the postponed Petrograd Congress, is a piece of special pleading in favour of the writer's own operation, one expresses merely what is obvious on the face of it; and an excellent paper it is, too, as an exposition of important points to be borne in mind when trephining.

Elliot begins by sweeping away the fine distinctions between "true filtering scars" and "fistulous scars," and clears the ground by declaring that we fail in our purpose if we fail to establish fistulisation. We must aim at the establishment of a permanent subconjunctival fistula.

In order to secure such permanent fistulisation we must have (1) asepsis, (2) a suitably-sized channel according to the needs of the case, (3) avoidance of entanglement of uveal tissue in the wound, either at the operation or later on. Failure of asepsis leads to formation of proliferative tissue in the trephine hole. A suitably-sized channel is to be obtained by using always a 2 mm. trephine and cutting off more or less of the disc of tissue marked out by it. The risk of impaction of uveal tissue in the wound is minimised by placing the trephine hole as far forward as possible. By the author's *technique* the trephined disc, hinged on its scleral side, can be dealt with according to the exigencies of the individual situation. No matter how much or how little of it we remove, the fistula formed lies on the corneal side of the wound, and all the tissue left remains interposed between the angle of the chamber and the inner opening of the fistula, thus removing the latter as far as possible from the neighbourhood whence danger may be feared.

The iris should be dealt with at the same time as the disc, both being divided with a single snip of the scissors. The great advantage of this procedure is that the eye is steadied by the forceps gripping the disc, so preventing an accident to the iris due to rotation of the eye before the iris has been cut.

The author next demolishes the bogey of the "vesicular scar," which is said to mean limited filtration. The prominent vesicular scar is a product of faulty workmanship. It does not occur, and, on the other hand, an extensive filtration area is established, if the flap of conjunctiva is (1) correct in form, (2) large in size, and (3) correct in the method of its preparation. With regard to these points the author's insistence on a large flap concentric with the limbus and at some distance from it is well known. The correct dissection of the flap, thin above, thick below, and actually bareing the sclera next the cornea, while at the same time leaving as much tissue as possible at the sides undissected, is also well known to readers of THE OPHTHALMOSCOPE who have studied Elliot's various articles. The last stage of the formation of the flap is the "splitting" of the cornea. Such flaps as the author describes are apt to fall into place without any stitches being required.

Post-operative iritis is next discussed. Quiet iritis is liable to take place in this as in other operations for the relief of tension. By the free use of atropine from the second or third day this kind of iritis can be reduced to the rank of an inconvenience. (The reviewer gathers that the writer holds that such iritis is not septic in character.) Apart from the type of quiet iritis, we may have a continuation of, or an exacerbation of, an acute or subacute condition which existed prior to the operation. "A careful survey of such cases suggests the idea that we have to do with a septic action which was in existence before the operation, and which is, for the present at least, beyond the operator's control. It is probable that toxicity, possibly in many forms, is playing no unimportant part in the pathogenesis of some at least of the conditions which we now, for convenience sake, are content to group together under the one label of "glaucoma," guided, as we are, by the one central and dominating feature of a rise in intraocular tension." Septic contamination at the time of the operation should be a very rare event indeed.

With regard to late infections, about which a good deal has been heard lately, these, Elliot points out, are not peculiar to his method of doing sclerectomy. In any case, there is yet much to learn about the *technique* of this recent operation. He suggests two conditions which may pave the way for the occurrence of late infection. These are: (1) The persistence of a leaking fistulette somewhere along the line of the original conjunctival incision. This can be speedly closed by touching with 2 per cent. silver nitrate solution. (2) The presence of a thin vesicular filtration scar. As has been said, this should not occur with correct workmanship. Lastly, in this connection, Elliot demands that we should impress on our trephined patients the risks of injuries or of conjunctival infections. ERNEST THOMSON.

3. Pterygium.

(1) **y Troncoso, Uribe.—A new operation for pterygium. (Nota acerca de una nueva operacion del pterigion.)** *Anales de Oftal.*, Abril, 1914.

(2) **Beard, C. H.—A new operation for the removal of true and false pterygium, or other growths at the sclero-corneal junction.** *Trans. Amer. Ophth. Society*, Vol. XIII, Part iii, 1914, p. 617.

(1) **Troncoso,** of Mexico, has found the usual operations for pterygium insufficient, and has conceived the idea of an autoplastic method. He dissects the pterygium away from the cornea, and scrapes the subjacent tissue with a sharp spoon; then laying the pterygium back across the cornea in its original position, he cuts it away with scissors, and marking out a flap of conjunctiva, he slides it so as to cover the raw surface left after the retraction, and fixes it with several sutures. HAROLD GRIMSDALE.

(2) The underlying principles of the operation described by **Beard,** of Chicago, remain the same, although the *technique* differs somewhat according to the nature of the growth to be removed. These principles are described by the author in the following words:—

"Primarily, the operation consists in the making of two incisions in the conjunctiva more or less vertical to the cornea, one on each side of the growth where it crosses the sclero-corneal junction; undermining or tunneling beneath the intervening membrane; passing a blunt-pointed knife through the tunnel, and shaving the growth from the cornea; the abscission of the growth (or of the head if it be a pterygium); dissection toward the base of the flap of conjunctiva; the formation of two lateral sliding flaps, so fashioned that, when their free ends are brought together, not only is the bared scleral area covered but a bridge of smooth, normal conjunctiva is interposed between the raw surface on the cornea and the base of the flap from which the growth has been excised; and, to complete the operation, three or more fine sutures are introduced to hold the loosened portions of conjunctiva in place till healing is insured."

4. The Eyelids.

(1) **Oretschkin, Boris.—The operative treatment of entropion and of trichiasis. (Zur operativen Behandlung des Entropiums und der Trichiasis.)** *Klin. Monatsbl. f. Augenheilkunde*, Dezember, 1913.

(2) **Kohan, M.—Operation for entropion of the eyelid. (Zur Operation der Entropion der Augenlider.)** *Klin. Monatsbl. f. Augenheilkunde*, Dezember, 1913.

(3) **Tiffany, Flavel B.—New plastic operation for entropion.** *Ophthalmology*, January, 1914.

(4) **Cantonnet, A.—External tarsorraphy in the treatment of spasmodic entropion. (La tarsorraphie externe dans le traitement de l'entropion spasmodique.)** *Archives d'Ophtalmologie*, juillet, 1914.

(1) **Oretschkin**, of Samara, divides his paper into two portions.—1. He finds that in Snellen's operation for entropion, the tying of the sutures interferes with the nutrition of the everted portion of the lid border, and leads to sloughing. He modifies the operation by fixing the ends of the sutures to the brow by means of plaster instead of tying them. The results of the operation are good, and sloughing never occurs. 2. In the operative treatment of partial trichiasis, due to trachoma, he makes a linear intermarginal incision outside the line of the affected hairs, and in such a direction as to expose the hair bulbs. The latter he destroys with the knife or otherwise.

A. J. BALLANTYNE.

(2) **Kohan**, of Tschernigow, describes his own operation.—The marginal portion of the lid "cartilage" is isolated by means of a horizontal incision from the conjunctival surface and a vertical cut at each end of the lid. This segment of the tarsus with the ciliary border of the lid is then everted by the insertion of the sutures. The operation is only to be clearly understood by reading in detail the author's own description and studying his diagrams. It is said to be indicated in the severest cases of entropion with atrophy and deformity of the tarsus, and is claimed to give highly satisfactory results.

A. J. BALLANTYNE.

(3) The operation described by **Tiffany**, of Kansas City, has some resemblance to that of Dianoux.—A narrow strip of skin just outside the lid border and parallel to it is dissected up without detaching its extremities. An intermarginal incision is made the whole length of the lid, and at each end of it a small opening is made from the intermarginal incision, beneath the hair-bearing part of the lid margin, to the bed from which the strip of skin has been raised. This strip of skin is divided in the middle and each half is passed through one of the openings to lie in the intermarginal groove.

A. J. BALLANTYNE.

(4) **Cantonnet**, of Paris, finds external tarsorraphy to be very efficacious in relieving spasmodic entropion. He considers that it acts partly by narrowing the palpebral fissure and partly by making the lower lid more dependent in its action upon the upper.

He has not hitherto found it mentioned as a recognized procedure.

BERNARD CRIDLAND.

5. Miscellaneous.

(1) **Critchett, Sir Anderson.—Case showing the result of peritomy.** *Proceedings of the Royal Society of Medicine*, March, 1913.

(2) **Harman, N. Bishop.—Case of exenteration of the orbit, with partial excision of the maxilla and ethmoid for rodent ulcer.** *Proceedings of the Royal Society of Medicine*, June, 1913.

(3) **Augstein, Carl.—Operation for a bulbar cyst with good result. (Operation einer Bulbuszyste mit gutem Erfolg.)** *Klin. Monatsbl. f. Augenheilkunde*, September, 1913.

(4) **Helmbold, R.—Upon the use of conjunctiva in wounds of the eye. (Die Verwendund von Bindehaut bei Augenverletzungen.)** *Zeitschrift für Augenheilkunde*, März und April, 1914.

(5) **Dutoit, Charles.—Some results of the palliative treatment of choked disc in cerebral tumours. (Quelques résultats du traitement palliatif de la papille etranglée dans les tumeurs cérébrales.)** *La Clinique Ophtalmologique*, 10 mai, 1914.

(6) **Elliot, R. H.—Asepsis and antisepsis in operations on the eye.** *Transactions Ophthalmological Society U.K.*, Vol. XXXIV, 1914.

(1) The discussion on the case of peritomy with good result by **Sir A. Critchett**, of London, operated on for recurrent kerato-iritis with very vascular cornea and much thickened and injected conjunctiva, revealed a consensus of opinion that this operation was often very useful, but that there was a tendency on the part of surgeons to forget it. In performing the operation Critchett pointed out that it is essential to do it thoroughly and to remove sufficient tissue right down to the sclerotic. Nothing should be left behind.

ERNEST THOMSON.

(2) It is hardly necessary to relate the minuter details of this case by **Harman**, of London. The moral is the thing. A rodent ulcer, of small size when the patient was first seen, was treated by X-rays, by zinc ions, by radium, and always the growth recurred. By the time Harman saw the patient, she had lost the whole of the lower lid, and there was a rodent ulcer nearly as big as a penny and adherent to the maxilla. Eighteen months after the removal of this ulcer with some of the periosteum and the lacrymal sac, the disease recurred in the orbit. The whole orbit had to be cleared, and then it was found that bone was involved, and so the whole of the lower and inner walls of the orbit were removed. The patient made an excellent recovery, and has now a cavity which "would not receive an undersized walnut." The moral is obvious, that nothing equals cold steel, and that at an early stage.

ERNEST THOMSON.

(3) **Augstein,** of Bromberg, describes the case of a child who presented at birth a tumour which caused a bulging of the left upper lid. When the eye was open it was found that the growth was attached to the upper-inner part of the eyeball and encroached on the margin of the cornea. On the left side of the face there was a warty nævus, divided into three parts corresponding with the three divisions of the fifth nerve.

Assuming the epibulbar tumour to be a subconjunctival lipoma, the author attempted its removal, but discovered that it was a cyst of the eyeball, its interior communicating with the vitreous chamber by a narrow opening. The wall of the cyst was removed and the wound sutured. The result was good.

A. J. BALLANTYNE.

(4) **Helmbold**, of Danzig, strongly approves of the employment of conjunctival flaps to cover wounds in the cornea and sclera. He gives full details of a number of cases, many of which he thinks did far better than could have been expected had the method not been used. He prefers, when possible, to make a pocket in the conjunctiva and draw it over the defect, rather than to separate a double pedunculated strip and place it over the wound. This latter method, recommended by Kuhnt, leaves a raw surface which may become

infected. The paper contains a historical retrospect of the operation, which is said (upon somewhat doubtful evidence) to have been first performed by the elder Pagenstecher. T. HARRISON BUTLER.

(5) The article by **Dutoit**, of Montreux, is divided into four parts. In the first part, the author emphasises the importance of decompression in these cases. The patients do not all die, but all run the risk of blindness. In the other three parts he gives a review of the various methods employed by surgeons: decompressive trephining, lumbar puncture, and puncture of the corpus callosum. S. E.

(6) The excellent article by **Elliot**, of London, is the outcome of his own experience *plus* his observations at a large number of clinics "in Europe, in Asia, in Canada and in America." From his observations he concludes that our methods require standardization, or, to be accurate, "some measure of standardization." "We should aim at being thorough and conscientious without becoming faddy or impractical. A good standard to set before ourselves is an imitation of the *technique* employed in a bacteriological laboratory for the prevention of contamination of a culture. In its entirety, this obviously cannot be lived up to, but it is possible to get much nearer to this standard than is often done, and I am convinced our results would benefit thereby." Surely these are words with which every ophthalmic surgeon of the present day will agree.

The author deals in detail with the sterilization of instruments, with the management and arrangement of instruments, and with the handling of instruments. He discusses the preparation of "drops"—and incidentally describes an ingenious arrangement of his own—the preparation of sutures, the insertion of sutures in such a way as to avoid contamination, the preparation and application of dressings, the sterilization of irrigation fluid, and the sterilization of the hypodermic syringe. With regard to swabs, Elliot uses cotton wool on little sticks, made from the mid-ribs of cocoa-nut palm leaves. In order to avoid "fluffy dry swabs" and the inefficiency of wet ones, the mounted swabs are sterilized in bundles in the autoclave; then, just before operation, they are dipped into boiled water and wrung out in the fold of a sterilized towel. Under the heading "surgeon's clothing," gloves, mouth masks, and coats are dealt with. Finally, come some paragraphs on the preparation of the patient. There is an immense amount of information in this paper which cannot be dealt with in an abstract.

Among the speakers in the discussion which followed were Straub, of Amsterdam, and Landolt, of Paris. ERNEST THOMSON.

BOOK NOTICES.

Le Trachome (La Conjonctivite Granuleuse). By ELENA PUSCARIU. Bucuresti: Tipografia Moderna Cultura Societate Colectiva. Pp. 37, with one coloured plate. 1914.

In her interesting *brochure* Puscariu deals with trachoma from a clinical point of view, with special reference to Roumanian considerations Its introduction into the Roumanian Army in 1854 followed the Russian and

Austrian occupancy. In 1900 15·9 per cent. of the Army were affected. At present 5 to 7 per cent. of the school children of Bucharest suffer from the disease.

Puscariu cites twelve instances in which she has carefully traced the contagion, which although lasting throughout the disease, is greater in acute cases, and where there are secondary infections. The help in diagnosis which bacteriology and the study of sections gives in certain cases is mentioned.

In acute trachoma the instillation of silver nitrate solution (2 per cent.) until cessation of discharge, is recommended, followed by Manolesco's "*brossage*"—the use of small sterilised brushes, like tooth brushes, to the everted lids after the application of cocain, adrenalin, or, in children, chloroform, as a general anæsthetic. The conjunctiva is fixed by forceps near the cornea and drawn down, whilst the brush is used horizontally to the everted upper lid. The lower lid and then the angles, especially the internal one, are next treated. Iodoform ointment and a moist dressing are applied, and these dressings continued for twelve to fifteen days or until cicatrisation is complete.

For incipient chronic trachoma, *brossage* is indicated. For the second and third stages of chronic trachoma, where the tarsal conjunctiva and tarsus are invaded, curettage, followed by the light application of copper sulphate stick, then *lavage* and a moist dressing with dionin ointment. The author considers *brossage* and *curettage* much superior to treatment with Knapp's roller forceps.

Heissrath's combined excision of the tarsus Puscariu used for the cases where the *cul-de-sac* has undergone complete cicatrisation, whilst the tarsal conjunctiva presents granulations, and the tarsal cartilage is swollen, hard, and incurved.

Kuhnt's simple excision of the tarsus is adopted for cases where the conjunctiva has healed spontaneously or after *curettage*.

In children under sixteen years of age, conservative treatment is recommended, since excision of the tarsus arrests the development of the lid. *Brossage* and *curettage* are the measures to adopt.

If there is complete entropion of the upper lid, Panas' method; if partial entropion with trichiasis, that of Spencer Watson is used. For pannus, the cautery, scarifications, or injections of cyanide of mercury may be used, in addition to the preceding measures.

Puscariu mentions the prophylactic precautions taken in Hungary. These include notification, non-acceptance of the affected as army recruits, inspection of schools, prisons, and places where people congregate, compulsory submission of the patient to treatment, provision of free hospital treatment for the poor, provision of good courses in the clinics and universities for the medical officials, and the education of the public by lectures and articles on the avoidance of contagion.

An excellent bibliography is provided. H. HAWARD BYWATER.

CORRESPONDENCE.

[While The Ophthalmoscope will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

THE FUTURE OF THE EYES THAT ARE SUBJECTED TO CERTAIN METHODS OF TREATMENT.

To the Editor of The Ophthalmoscope.

Sir,

In this country it is becoming fashionable to use subconjunctival injections of cyanide of mercury, fibrolysin, and similar powerful drugs to clear the cornea of pannus, to smoothen the granular surfaces of the lids, and to effect an improvement in certain deeper diseases of the eye as well. I am not now prepared to discuss the comparative merits of the above methods, but I want to impress upon ophthalmic surgeons the dangerous future of eyes subjected to the above methods of treatment.

The result of such procedures is to create a firm adhesion between the freely mobile conjunctiva and the sclerotic by scar-formation in the subconjunctival tissues. The solutions of cyanide and the various other powerful drugs, if rapidly absorbed in the same way as an ordinary saline subconjunctival injection, may not produce this result, but as they very often continue as local lumps for about a week or more before they are completely absorbed, the invariable and almost the inevitable result is a firm conjunctiva, which cannot be picked up by forceps as a fold off the subjacent sclerotic.

There is another minor operative procedure leading to the same disadvantage, *viz.*, the operation of peritomy practised for the clearing up of pannus, which very often persists even after the disappearance of granules and scar formation.

An immovable conjunctiva is not the result, if the same is simply removed in a ribbon-shaped manner all round the cornea by just a few snips of the scissors (but an incurable cornea is the result). So, as students of Lt.-Col. R. H. Elliot, we are asked, of course quite reasonably, to cut with the help of a sharp-pointed scissors, down to the sclerotic every vessel that is seen by the corneal *loupe*, and, in fact, we are specially advised not to use adrenalin before the operation for fear of the vessels disappearing from view.

No doubt this procedure clears the cornea in a surprisingly quick manner, but what results is a firm immobile conjunctiva all round, or what is more likely, dense ribbon-shaped scar tissue on the sclerotic all round the cornea.

If such an eye becomes glaucomatous, the sclero-corneal trephining cannot be done at all. In fact, I have had to depend upon a plain broad iridectomy in 14 cases during the last twelve months, although I had a great desire to do the Elliot operation in those unfortunate eyes.

Personally, I am in favour of doing a peritomy according to Elliot's teaching, but I have now begun to realise that it is an impossibility to do a sclero-corneal trephining on such eyes if they return for glaucoma in a few years' time, as it is essential to dissect off a conjunctival flap to cover the trephine hole, which is an absolute impossibility in eyes subjected to the foregoing methods of treatment. The forceps in such cases cannot get any tangential grip at all, but only the whole globe will be seized.

Perhaps, one is to avoid the above methods if the eye has any predisposition to glaucoma, such as a shallow chamber, etc., but in my hands peritomy done according to Elliot's teaching is giving the best and quickest result in dense leucomatous pannus cases, and I am between the devil and the deep sea if I see a case of plain pannus, and I will feel, at the same time, highly criminal if I let go a patient affected with pannus without doing a peritomy, on the score of a remote possibility of a glaucomatous attack, which will, perhaps, permanently ruin the sight before the patient reaches you, and which, even if the patient comes in time, is not going to be much benefited, do what you like beyond leeches, eserine, and purges.

Elliot's operation is becoming so popular all over the world that it is the duty of every ophthalmic surgeon to find out how best to solve the above problem

I beg to remain, Sir,

Yours faithfully,

E. V. SRINIVASAN, M.B. AND C.M.

DVARAKA, EDWARD ELLIOT'S ROAD,
MADRAS, S.,
5th November, 1914.

NOTES AND ECHOES.

Deaths. WE note with regret the death, on October 22nd last, of Walter Jennings Milles, once house surgeon to the Moorfields Ophthalmic Hospital. Mr. Milles practised ophthalmic surgery for some little time in London, but in 1884 he left to take up general practice in Shanghai.

The death is announced of Harry D. Belt, of Chicago.

* * *

Dr. R. A. Reeve. DR. R. A. REEVE, a figure well-known at ophthalmological meetings in this country, has resigned his post of professor of ophthalmology in the University of Toronto, and has been succeeded by Dr. J. M. McCallum.

* * * *

Appointments. MR. W. T. LISTER has been appointed by the War Office consulting ophthalmic surgeon serving with the Expeditionary Force in France. Consulting officers serving abroad hold the military rank of colonel, and receive pay at the rate of £2 5s. a day, together with field allowance of 7s. 6d. *per diem.*

Mr. C. J. H. Gunning has been appointed ophthalmic surgeon (temporary) at the Marylebone General Dispensary, Welbeck Street, W.

* * * *

Mr. Angus MacNab.

At a meeting of the Section of Ophthalmology of the Royal Society of Medicine held in London on December 2nd, touching reference was made by the president, Mr. Priestley Smith, to the loss of Angus MacNab. A resolution of sympathy with his family was passed by the Section.

Apropos MacNab's death at the hands of the Germans, a curious report appeared in one of the London daily papers of December 9th last. The following extract was quoted from a letter by a second lieutenant in the Black Watch, dated November 27th :—" You will be glad to know that the London Scottish doctor, Captain MacNab, is not killed, but a prisoner." The news is almost too good to be true.

THE OPHTHALMOSCOPE DIARY.

1915.

Midland Ophthalmological Society.	February 2nd	Nottingham.
Royal Society of Medicine : Section of Ophthalmology	February 3rd	1, Wimpole Street, London, W.
Royal Society of Medicine : Section of Ophthalmology	June 9th	1, Wimpole Street, London, W.
American Ophthalmological Society	July 6th & 7th	New London, Conn.
British Medical Association : Section of Ophthalmology	July 7th to 9th	Cambridge.
Oxford Ophthalmological Congress	July 15th & 16th	Keble College, Oxford.

THE

OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. XIII.—No. 2.] FEBRUARY 1, 1915. [TWO SHILLINGS

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ORIGINAL COMMUNICATIONS.

A TUMOUR OF THE EYE PRESENTING UNUSUAL FEATURES.

BY

ROBERT HENRY ELLIOT, M.D., F.R.C.S., LIEUT.-COL., I.M.S.,
LONDON, ENGLAND.

Devanai, *æt.* 14 years, Hindu female, Kodambakam, Madras, admitted to the Government Ophthalmic Hospital, Madras, in February, 1913.

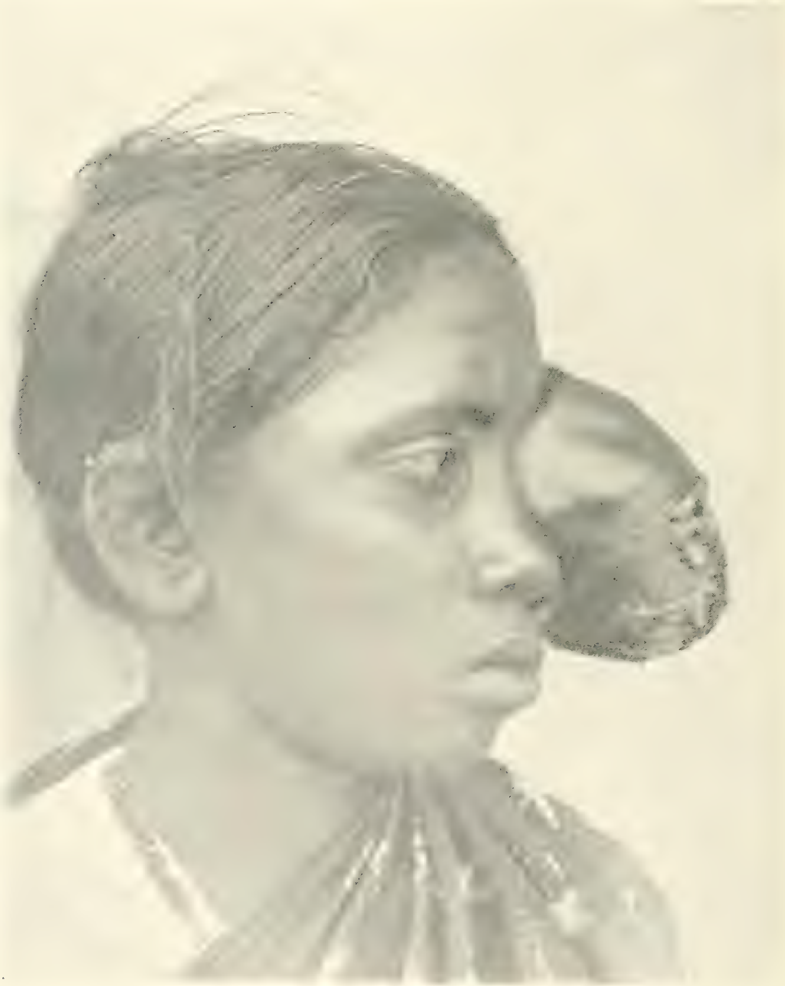

FIG. 1.
Side view of the face before operation.

History.

About nine years ago, a slight protrusion of the left eyeball was first noticed. This gradually increased, and the present condition was reached about a year ago ; since then the tumour has not grown to any appreciable extent (parents' statement).

A year after the growth commenced, the lids could not be closed. Later, ulceration occurred, and the eye could not be recognised as such.

Present Condition.

A huge tumour projects from the left orbital cavity, the anterior third or less being uncovered by skin. The uncovered portion is red, ulcerated, and covered with yellow crusts. It bleeds readily when interfered with. The veins of both lids are enlarged, but not markedly so, except at the outer canthus, where they appear varicose. The lids are in constant movement over the growth, to which they appear to be very loosely attached. The skin is soft and free, and shows no sign of infiltration.

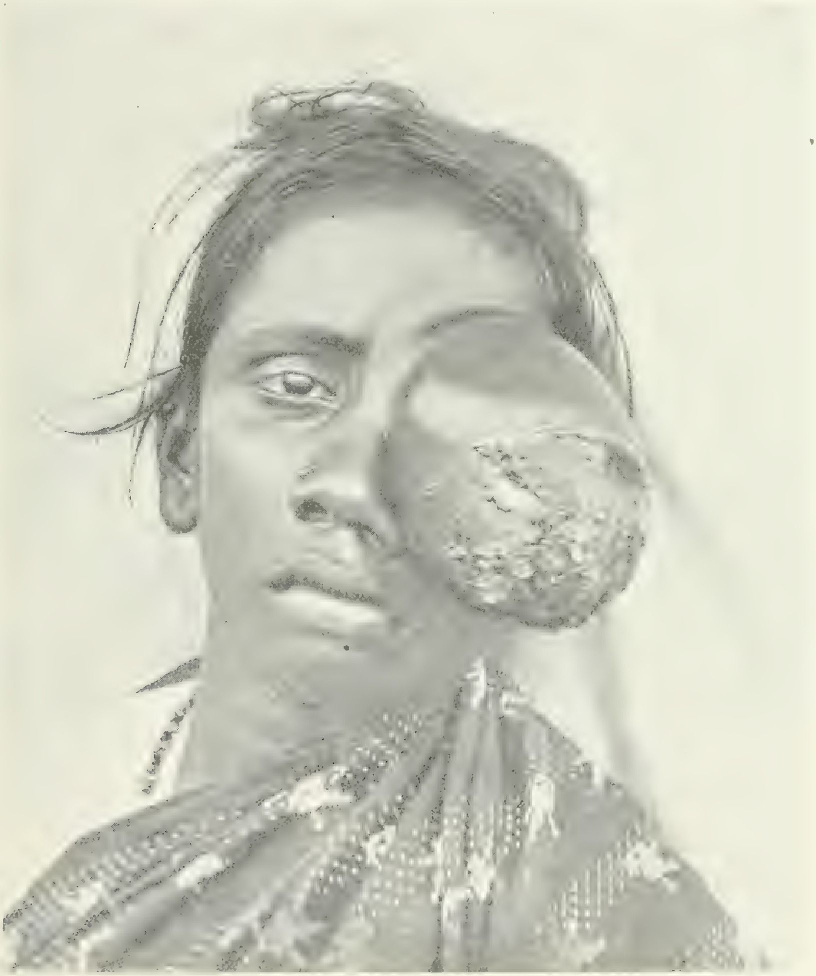

FIG. 2.

Front view before operation. Notice the line where the skin passes into the mucous membrane of the everted conjunctival *cul-de-sac.* The whole of this surface is hidden beneath dry crusts of discharge, emanating from the ulcerated surface. The healthy state of the patient's nutrition is well seen in the photographs.

The tumour pushes the left nostril downwards and towards the middle line of the face. The site of the cornea can be guessed at by the existence of a grey area. The tumour itself does not move appreciably with the movements of the opposite eyeball, although the skin, actuated by the orbicularis and levator palpebrarum, moves over the tumour in an uncanny way (see Figs. 1 and 2).

The absence of (1) marked enlargement of vessels and (2) of signs of infiltration was held to point to the growth being non-malignant. This was borne out by the history of nine years' duration.

Operation, 1st March, 1913.—An incision was carried horizontally inwards and outwards in what had been the region of the canthi, and the skin was dissected back; the tumour was separated easily from the surrounding parts, and the dissection was made without difficulty until the apex of the orbit was reached. The pedicle was here met with, and was cut through with scissors and a periosteal elevator, the structures divided being firm and fibrous. The hæmorrhage, which up to this point had been trifling, now became most alarming, and could only be arrested by firm plugging with antiseptic gauze.

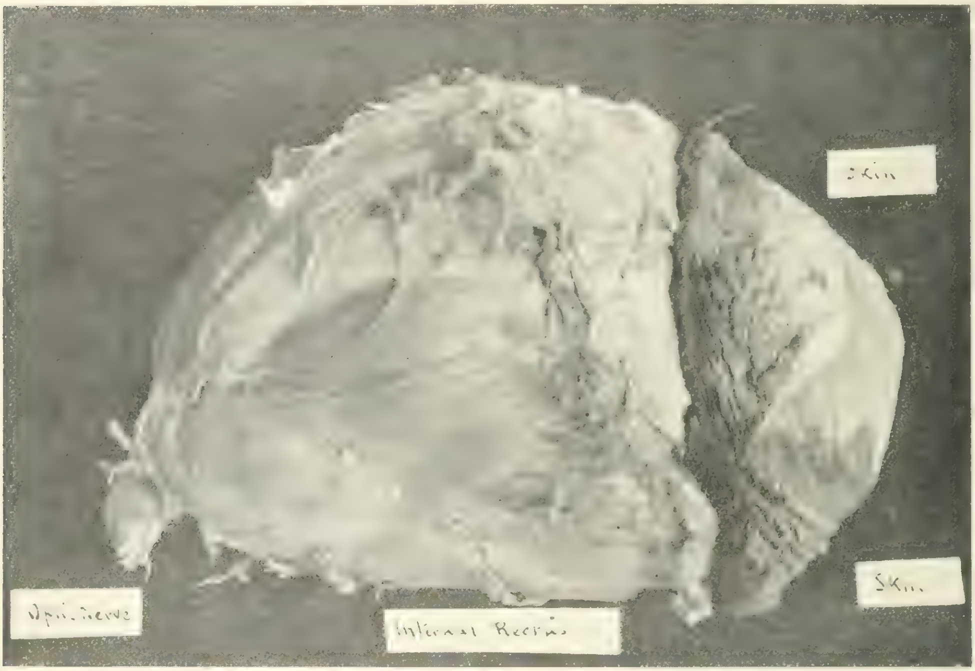

FIG. 3.

The superior and internal recti are seen in this specimen. The great breadth of the latter is well shown; it extends from less than an inch from the top of the tumour right down to the lower edge thereof. Natural size.

The tumour on removal was egg-shaped, measuring 119 mm. from before backward, 75 mm. laterally, and 80 mm. vertically.

The boundary between skin and conjunctiva could be clearly made out and all round, by the fact that the conjunctival area was not pigmented. The folds of the conjunctival cul-de-sac were completely obliterated, the cul-de-sac being turned inside out; a mere ridge separated the skin and the mucous membrane. The pale surface was originally ulcerated.

It was clear that the tumour was an enormously distended eyeball whose outer coat was immensely hypertrophied. The extra-ocular muscles had shared in the extraordinary hypertrophy. The levator palpebrarum, at the termination of its muscular portion, was 28 mm. in breadth. The external rectus was 36 mm., the internal rectus, 34 mm., and the inferior rectus, 21 mm. in breadth.

The optic nerve entered the posterior pole of the tumour, and there measured 10½ mm. in diameter; 19 mm. of the nerve had been removed.

The posterior pole of the tumour had a black appearance suggestive of a posterior staphyloma. The wall at this point was thin and the contents were obviously fluid. The whole tumour gave the impression of a hard multilocular cyst, with contents of varying consistence, some parts being firmer than others.

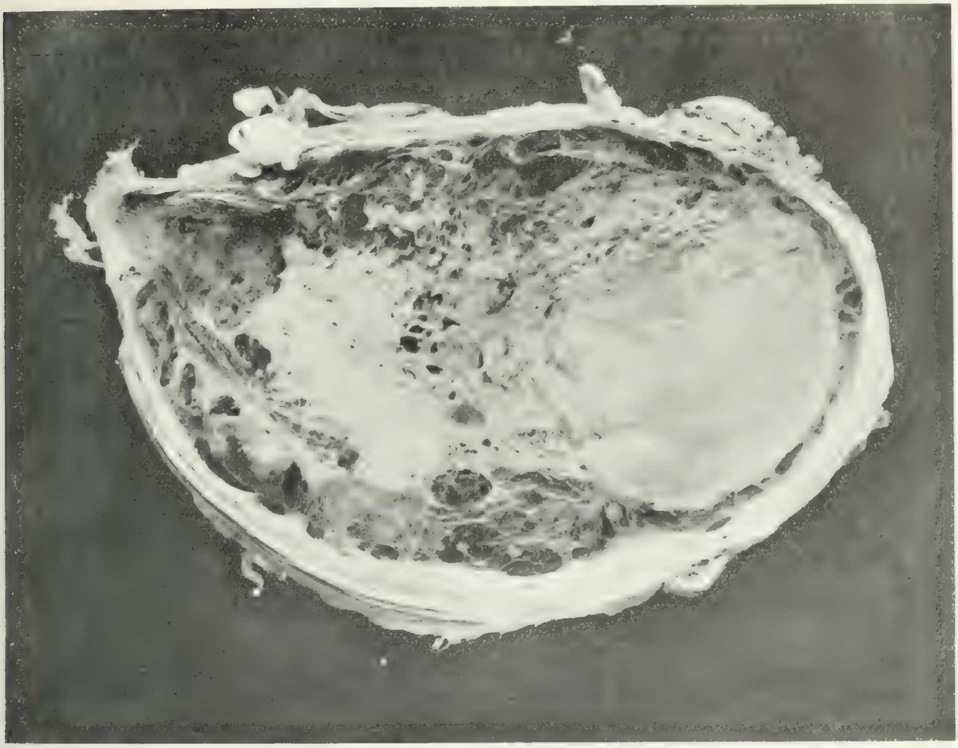

FIG. 4.

A section of the same half of the tumour; the corneal end is to the right and the optic nerve to the left, and above. The upper surface of the tumour is shown below. Natural size.

The tumour was placed in 5 per cent. formalin for five days. It was then frozen and bisected by a vertical antero-posterior cut, and was found to consist of an enormously distended eyeball. The walls, composed of hypertrophied cornea and sclerotic, could be clearly traced. The limbus and canal of Schlemm were clearly defined.

The anterior portion of the contents consisted of a yellowish mass with fibrous bands running through it, and in shape suggested an enormous lens, whilst the posterior three-fifths consisted of what looked like cavernous tissue in which could be seen a large number of cavities filled with a dark jelly-like material. In the middle of this posteriorly was a firmer yellow mass, which more anteriorly passed into the cavernous-looking structure.

The optic nerve could be followed into the commencement of what appeared to be detached retina.

The scleral wall was enormously thickened, especially at the upper part, where it measured 7.5 mm., whilst at the limbus the coat was 10 mm. thick (see Figs. 3 and 4).

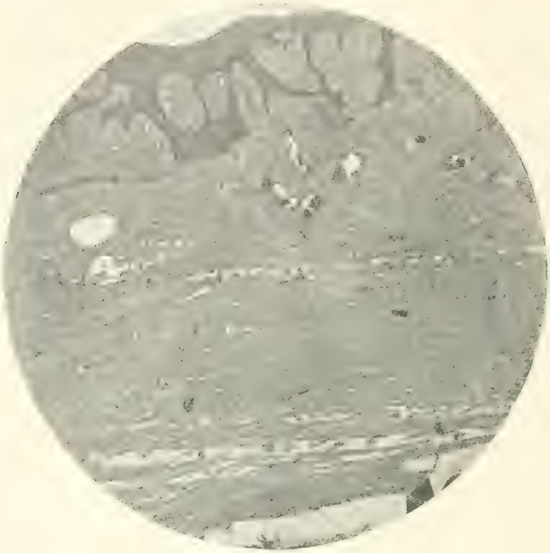

Fig. 5.
Skin side of section, × 25 diameters.

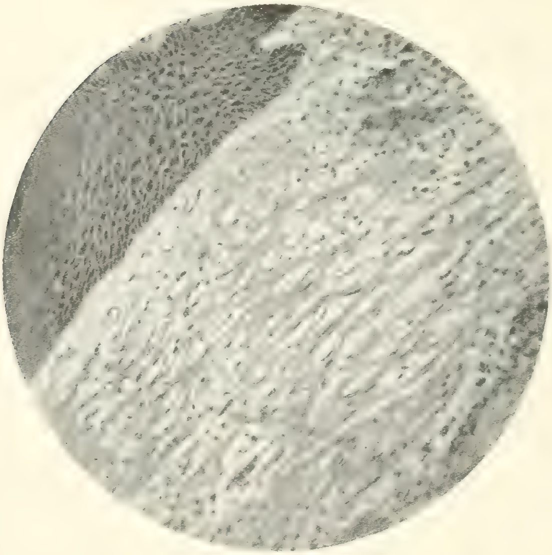

Fig. 6.
Skin side, × 160 diameters.

Sequel.

The sequel was unfortunate. The temperature rose steadily to 105.6° F. on the fourth day, and the patient then died. There were no convulsions, but there was restlessness with an extremely rapid pulse.

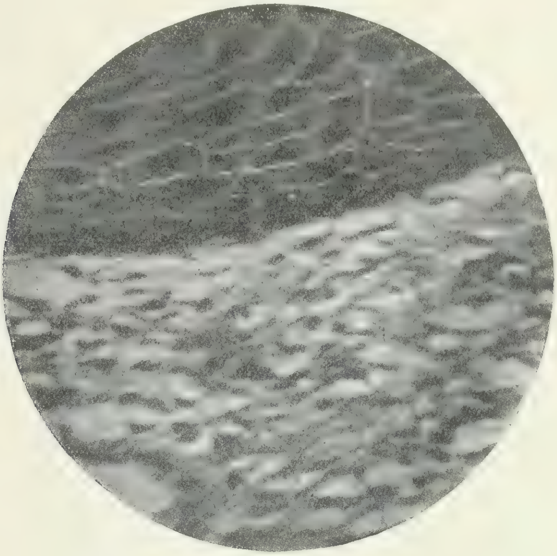

FIG. 7.

Skin side of specimen, magnified 400.

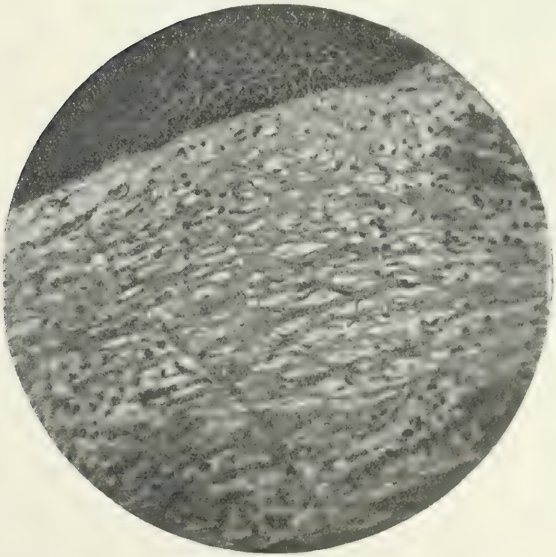

FIG. 8.

Pathology.

After I left India, the tumour was kindly examined by Dr. Tirumurthi, whose report is attached.

The interesting features of the case are the slowness of the growth, the enormous size of the tumour, and the extraordinary hypertrophy of the muscles and of the tunic of the eye.

The photographs are by Mr. C. G. Taylor, second assistant, Government Ophthalmic Hospital, Madras.

Pathological report by Dr. Tirumurthi, assistant, Medical College, Madras :—

Section from the posterior pole shows externally a fibrous tissue capsule in which muscle fibres lie. These appear to be striped muscle fibres, the striation being, however, only occasionally visible. The interstices of the spongy tissue in this region are much smaller, and mostly contain red blood corpuscles. Much fewer unstriped muscle fibres are also seen in this region.

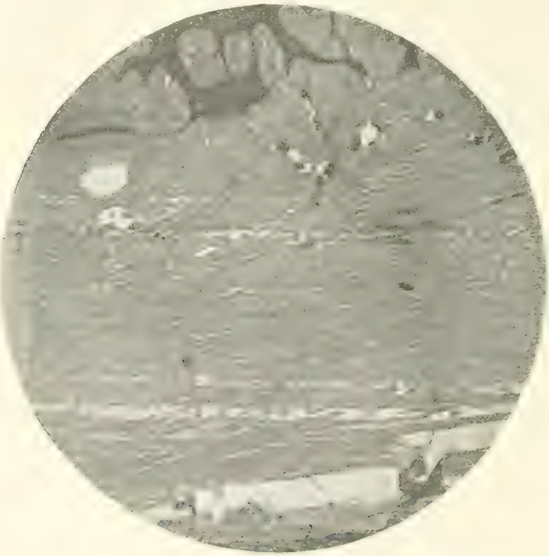

Fig. 9.

The cells are mostly small, having rounded, darkly-staining nuclei which almost completely fill the cells.

Section from the anterior pole.—A hyaline fibrous capsule is seen, this is covered by flat epithelium which has very irregular papillæ. The corneous (*sic*) layer is partly detached and covered by masses of degenerative leucocytes. The corium is densely infiltrated in places with small round cells. The tissue lying under this consists of a homogeneous matrix, in which are large multipolar branching cells, having a round or oval nucleus situated to one side. Fine processes can be traced from these cells into the matrix, also numerous smaller cells with rounded darkly-staining cells resembling glial cells. There is no trace of any ocular tissue throughout (see Figs. 5 to 9).

Pathological Description by R. Affleck Greeves, F.R.C.S.

Curator and Librarian Royal London Ophthalmic Hospital.

Three mounted and stained sections from three different parts of the tumour respectively were handed to me by Colonel R. H. Elliot, together with the paraffin-embedded blocks from which these sections had been prepared.

The following description is little more than a record of the structure of each part, as the selected pieces are too small and few in number to throw any light on the nature and place of origin of the tumour.

Sections from the anterior part of the tumour.

The tumour is bounded anteriorly by a stratified squamous epithelium, the superficial layers of which are keratinized and are becoming desquamated. The intermediate layers consist of prickle cells, while the basal cells are elongated and rest on a definite basement membrane. There are numerous well-marked papillæ. In short, the epithelium resembles that of the skin, except for the absence of hair follicles and sebaceous and sweat glands. The epithelium rests on a layer of loose connective tissue, in which there is a dense round-celled infiltration, and deep to this layer is a well-defined layer of laminated connective tissue, sparsely vascularized. The latter layer varies in thickness, but is roughly twice as thick as the normal cornea. No trace of true corneal tissue or of Descemet's membrane can be seen in the specimen. Deeper still, the structure of the tumour becomes much looser; the greater part has a delicate fibrillar structure, the fibrils forming a kind of spongework, in the meshes of which is contained a homogeneous substance. The blood supply is poor, and most of the vessels have definite walls. A few very large thick-walled vessels traverse this part of the tumour, and in connection with these vessels trabeculæ of ordinary fibrous tissue intersect the more open spongework of fibrils which makes up the greater part of the mass.

The fibrils themselves are seen to be the branching processes of large multipolar cells, each of which possesses a deeply-staining ovoid nucleus with a large and somewhat granular cell body of irregular shape. Most of these cells are mononuclear, but a small proportion contain two nuclei, and a very few are multinuclear.

These cells and their processes strongly suggest nerve tissue—possibly they are altered neuroglia cells derived from the invaded and disorganized retina, but, of course, this is merely a suggestion, as there is no means of discovering their origin from the small piece of tissue at my disposal for examination.

Besides these large multipolar cells, there are numerous apparently free deeply-staining nuclei scattered about; these are possibly inflammatory cells.

Central part of the Tumour (spongy part).

This part of the tumour consists of irregularly arranged, fairly richly nucleated connective tissue, containing few blood-vessels. This tissue encloses numerous enormous spaces which contain a granular coagulum, in which some leucocytes and a few swollen hydropic cells can be seen. There does not appear to be any definite endothelial lining to the spaces.

Scattered here and there in the connective tissue stroma are some large irregular-shaped cells, with granular cell bodies. These cells resemble somewhat the multipolar cells described as present in the anterior part, but they do not show any processes.

There are no signs of recent inflammation in this part of the tumour.

Owing to the poor fixation in this central part, it is impossible to determine the exact nature of the cells and tissues; indeed, it is quite possible that the apparent absence of processes from the large granular cells is due to faulty fixation.

Posterior pole.

Except for the presence of a rather thin connective tissue capsule on the posterior surface, this part of the tumour differs little from the central spongy part. There are a few small spaces, instead of the numerous large ones of the spongy part, and the intervening tissue is more cellular—in fact, in one part an inflammatory infiltration of small round cells is suggested. No large granular cells can be seen A few striated muscle fibres are attached to the outer surface of the capsule; this suggests that the capsule represents the sclerotic, and that the muscle fibres are remnants of an external ocular muscle.

Conclusion.

It will be seen from the above description that the tumour is of a very unusual nature, taking into account the fact that its clinical manifestations oblige us to regard it as having been of intra-ocular origin.

Colonel Elliot has promised to obtain the original tumour for me from India, and I hope to be able to make sections in bulk, in order to ascertain, if possible, what parts, if any, of the eye were preserved.

With the material at present available, I consider it impossible to say definitely where the tumour originated, or to pronounce an opinion on its possible nature.

The result of further investigations will be duly published in THE OPHTHALMOSCOPE.

"EYE" IN SPORT.

BY

ROBERT W. DOYNE, M.A., F.R.C.S.
ONE-TIME READER IN OPHTHALMOLOGY IN THE UNIVERSITY OF OXFORD.

(*Continued.*)

Croquet.

The requirements of "Eye" in croquet are similar to those in billiards. To determine whether the ground be fast or slow requires judgment in the same way as do the cushions and cloth of a billiard-table. Among first-class players this requires a greater degree of accuracy than is claimed for the ordinary moderate player, who does not rely to the same extent on cutting the ball in various directions. In the old days of croquet the main difficulty used to be hitting a ball, but nowadays a much greater degree of accuracy is required in getting through a hoop than in striking a ball. In all except close shots, players presumably do not make any other attempt than to strike the ball with such degree of strength as to constitute the rush necessary to move the ball the required distance. The question as to what angle a ball should be struck is not usually considered in what are known as long shots, although the possibility can be recognised of a marvellously good player considering upon which side he should strike the ball from a distance of one end of the court to the other. Generally speaking, however, this consideration is reserved for closer shots.

Perhaps the most interesting problem in croquet is whether the eye should be used in the horizontal plane or in the vertical plane, that is to say, whether a facing or sideways attitude should be adopted. This selection is modified by the conditions of play. For freedom and power in striking the vertical plane is probably the best. For a dwelling stroke, in which the aim, having been made, has to be continually maintained during the stroke, the horizontal plane is best. Anyone, who has not played any other game, would select, at any rate at first, the horizontal plane, but those who have been trained to make use of the vertical plane, as in golf, would adopt the position to which they are accustomed and in which they have been trained. If conditions of sight were alone considered, the horizontal plane, in which the mental line of vision, *i.e.*, a line from a point midway between the two eyes, is being used, would be best. This is more advantageous for judging angles than the vertical plane, in which direct alignment is used, but which does not give the same intuition about angles. In playing in the horizontal plane, the player should incline his head over the mallet, the degree being modified by judgment, so that the mallet, the ball and the distance to the object ball are all aligned in the vertical plane with the mental line of vision. This is not so, if a man plays between his legs, in which case no leaning of the head is required, and which is only necessary in a modified degree in those who make use of one eye only. These are however, real exceptions, and probably no normal-sighted man adopts this latter procedure, although it is constantly claimed by certain players that they use this or that eye in aiming. As a matter of fact, although possible, it is very rare for the normal-sighted man to align with one eye. This can be proved in this way. If a player, after having taken aim with both eyes open, covers first one eye and then the other, without moving in the least degree, he will observe that neither eye is in alignment. In the act of striking it is important to keep the body absolutely steady. In order to do this, the player should fix with his eyes some point, as in golf or billiards. It does not matter, and this point is elsewhere emphasized, whether after taking aim the player fixes the distant ball or his own ball, or some point between the two. Of course, the system the player has practised will be the one he thinks most essential. The writer lays stress on this, because it is so common to hear dogmatic opinions expressed on the subject, for which there is no foundation except the individual's own practice.

Lawn Tennis.

In this game there are several manifestations of "Eye." Immediately on treading on the court the brain process begins. The player knows from the feel of the ground whether it is fast or slow, lumpy or true, and this will qualify materially his judgment of the behaviour of the ball. The surroundings and the orientation of the court, too, are important data for judgment. The service of the experienced player illustrates a high degree of brain judgment. The beginner, when he first takes a racquet in his hand, usually takes aim by deliberately presenting the centre of the face of the racquet to the ball. Then he withdraws the racquet and pats it over the net, quite high up to be clear of the net. The only real judgment that is used, and that is of the very slightest, is the strength to strike the ball so that it shall fall within the service lines, and practically no judgment is required in getting it widely above the net. Brain judgment proceeds in all directions, so that, eventually, in service the ball may be struck without looking at it. Of course, this is not always the case, for elaborate judgment is used by some players who throw the ball in the air and then strike it as it falls. Judgment is developed to such a degree as to the height of the net that it becomes almost a sub-conscious fact, and acts as a constant control on each stroke, and has probably a much greater effect on the delivery of quick service than the actual service lines. Individual peculiarities of service, such as cut and screw, require peculiarities of style which form important data for the opponent. The art of serving is carried to a very high degree of perfection by adepts at the game. Probably, one of the most important details in acquiring proficiency is always to try to do the same thing, not to serve hard when opposed by a particularly formidable adversary, and less hard when not so situated. If it is not desired to send hard service it is well to adopt another style completely, so as not to upset the deliberately co-ordinated association of muscles that has been trained to deliver a most effective service. Forcing in service is on a par with forcing in golf. When the increased impulse is given to the associated muscles, such impulse is not correctly co-ordinated among the group of muscles that is employed, and consequently some muscle overacts, and the effect on the ball does not correspond with the results anticipated from previous practice. The point is one that has not been sufficiently recognised by beginners, for it encourages a sort of uncertainty and stammer in the action of the associated muscles.

As to the receiver of the service, it is a very interesting problem to try to discover the first moment a player perceives the approximate place at which a ball will pitch. Of course, this is an extremely important point, and the player who has the earliest conception of this is immediately placed in a position of advantage. The writer has often enquired from experienced players how soon they get a conception of this, not only in service but during the course of the game. He has been told that a player himself can so place a ball that it is only possible for his opponent to return it in a certain direction, so that, as he is striking the ball himself, he can be prepared for the approximate place on which the ball will be returned to him. This is a wonderful insight into the future, and its counterpart is often found in the sequence of events in other conditions of life. In service, the earliest indication that the writer has known a player claim as to where the ball is going to pitch is the position of the face of the opponent's racquet, even immediately before and at the moment of striking the ball. After this, there are, of course, varying degrees of perception and the relation of the balls principally to the net and other surrounding conditions has enabled the player to estimate more or less accurately the spot on which the ball will pitch. Inexperienced players, of course, hardly form a conclusion before the ball has pitched, and then begin to run towards it. As experience advances, so a conclusion is formed at earlier periods and the player accordingly moves earlier to a position best adapted for returning the ball. There are other details that form important data in coming to a correct conclusion, such as the direction of the server's head and the direction of his gaze, for it will be recalled how often a player, at any rate, an inexperienced player, can be deceived by the striker looking in one direction and directing the ball in another. The effect of putting "cut" and "screw" on the ball must be learned, and that it is being used should be observed from the action of the striker, and when the effect is thoroughly appreciated by the opponent, the brain judgment is immediately modified accordingly. "Screw," at any rate, loses much of its deadliness, because judgment is not upset thereby. Volleying requires more accurate judgment, and is more difficult to attain, not only because it is quicker, but also because it is more difficult to modify. It is correspondingly more deadly in those who have accurately acquired it. A very deadly stroke is made when a ball is volleyed back direct quite straight at the opponent, The flight of the ball occupying very much the same position in the vertical and horizontal planes deprives the player of important data in forming a judgment, because, in its flight, the relationship of the ball to its surrounding objects is so very little altered; this constitutes a so-called "blind spot," analagous to a similar condition in cricket. This is so-called because for a moment the player is unable to form any accurate judgment as to the exact spot to which the ball is coming, with only a general impression that it is coming at him. Of course, knowledge that comes by experience conveys a correct impression to the expert, but those who do not come into this category have very great difficulty in estimating the flight of the ball. There are many little tricks that may upset "Eye," such as pretending to make a great muscular effort in preparing to strike the ball, so that the player runs backwards to receive it, and then, by check only giving a very slight tap to the ball, with the result that the opponent has moved away from, instead of approaching, the place on which the ball pitches. However, enough has been said to point out that the man who becomes the greatest expert is one who not only sends the ball, when he is within reach of it, skimming over the net with deadly effect, but he who has wide perception of the various details that give an effective grasp of what is going on, even though he may not always be very deadly in his actual strokes, but adopting the tactics of a "stonewaller" can tire to death his opponent, until he can with certainty kill him outright.

Golf.

Few games sound feebler when described than golf. Yet hitting a ball from hole to hole has engrossed the attention of more men and women than any other kind of sport. It is said of W. G. Grace, with what truth I do not know, that when, as a middle-aged man, he took up golf, he wondered how it was he had wasted so many years over cricket. Yet, simple as the game sounds, it calls for the need of "Eye" in its every aspect to a very great degree, and getting the hole in the fewest number of strokes is merely proof of the man who has the best "Eye." It certainly is not a sport to be taken up by any fool, and the most important qualification that a man has for the game is the possession of a good brain. To take James Braid as an instance, anyone who knows him and has had the pleasure of conversing with him will recognise his great brain power and will know him to be a man who would have succeeded in almost any walk of life. As before said, "Eye" is required in every detail of the game, and for the normal two-eyed man there is especial need of the use of both eyes. "Keep your eye upon the ball" is a conventional phrase which some have interpreted into the meaning "Keep your master eye upon the ball." What it should really mean is "Keep your two eyes upon the ball," for in striking the ball the golfer has to make many estimations, and these estimations in a normal-sighted man can only be accurately made by the use of both eyes. The exact estimation of the distance of the ball from him which he wishes to strike with the club can only be readily made by the knowledge of the length of the club. This is obtained generally sub-consciously, partly by the estimation of the two eyes and partly by the sense of touch in grounding the club behind the ball. The next step is the co-ordination of the muscles in the swing in striking the ball truly. There are roughly two elements in this, what may be called the swing proper, namely, the movements of the hands, arms and shoulders, and the rotation of the body in the act of swinging, but there is also fixing the body, as it were, on pivots, so that the swing and stroke shall be played true on the ball. It would appear, at first, that there is only one pivot or fixed point, the feet, or more correctly, according to authorities, the left foot, but there are really two pivots of the swing, as a gate swings on its posts, namely, at the left foot below and at the second pivot at the point halfway between the two eyes at the upper end. This may seem at first thought a purely theoretical and problematical statement, but it is not really so. Probably, more depends upon this so-called fixed point than upon that of the foot. Supposing that the swing be perfectly correct and the fixed point of the foot perfectly steady, but the other point, the eye point, which has been described as being a point midway between the two eyes, moves an inch backwards or forwards to or from the ball or to any degree from side to side, the correctness of the swing will be of no avail. The ball will be sclaffed or topped and the correctness of the swing will be no protection against this. Actually then, the golfer swings his body from two fixed points, the left foot which gravity keeps in its place, and the other point, kept true by the knowledge of the distance of the ball by means of the degree of convergence of the two eyes upon it, and by the fixity of the eye muscles, for if the eyes are kept constantly held in the position of convergence on the ball and directed at the ball, the head will be kept perfectly rigid, both in the backwards and forwards plane, as well as in the lateral plane, because any movement of the head would demand compensatory movement of the eye muscles.

Looking now at the co-ordination required in the swing, though the eyes and feet may keep the body fixed, there is a great scope for error, if the muscles be not properly associated and co-ordinated, which may cause the ball to be missed. Therefore, the fixed position of the head and feet is actually of primary and essential importance. The writer has said essential, but this is not strictly true, because when anyone becomes extremely experienced and every act becomes practically a reflex one, the experienced golfer with his eyes bandaged, if only he can ground his club behind the ball, may strike the ball absolutely correctly in driving, having really, in this case, fixed the eye point by means of his stance, through the intermediary of muscles of the body, instead of the eye. This, however, only means an enormously high degree of associated and co-ordinated act, so that it becomes practically a reflex that is originated by grounding the club behind the ball. The same sort of thing takes place when anyone, who has never held a club in his life before, plays his first game. He relies upon the associated movements which have been developed from other things, such as cutting off the head of a daisy with a walking-stick, and so with the eyes trained in that way, he may play his first game surprisingly well, but such "Eye" soon becomes absolutely stale, and his second or third game demonstrates his incompetency. Now, the condition called pressing is often a source of failure at golf. This is a state of things that may be readily understood from what has been said before The association of muscles is an extremely delicate form of balance and if, by desire to drive far, voluntary stimulus is given to certain muscles, muscles not subject to or beyond the power of the co-ordination centre, failure results. Judgment of distance in an approach shot requires much more than a mere control of strength it also means the selection of a special club and a special way of striking the ball to produce the desired result, not merely a diminution of strength, but also the kind of stroke that produces a skying effect on the ball, in order that it may not travel far after it has pitched. As regards putting, rather different conditions prevail, and the judgments, though perhaps not of greater importance, are more delicate in degree, for exact direction becomes of even more importance than the degree of strength of the stroke. This too, however, if not of equal, is also of great importance, because only a small latitude of strength can be granted in a successful putt, but practically hardly any latitude can be allowed in the matter of direction. Now, in the act of putting the question of position must be considered, whether a modification of the drive or some special position shall be adopted. In the course of play special strokes may come on, such as chopping strokes and wrist and arm strokes, such as are used in getting balls out of bunkers and obstacles, but, in the ordinary and uneventful play, from the tee to the hole may be merely a series of modifications from the drive to the putt. But there are other forms of putting which are special and cannot be considered as a modification of the drive. Peculiar positions, etc., are taken up or a more pushing way of hitting adopted. This may be summed up in saying that when delicate estimations have to be made, either a very experienced and co-ordinated set of muscles have to be used, such as in ordinary driving, or few muscles,—in other words, the fewer muscles that have to be used the easier it is for the brain to co-ordinate the movement. For instance, if the body and the upper arm be kept perfectly still and merely the muscles of the fingers and the fore-arm be used, it is a much less complex job for the brain than if it had to co-ordinate a greater number of muscles. In the same way, those who putt by taking a purchase with the arm resting on one leg again eliminate the need of the use of certain groups of muscles. It would appear that in successful putting the effort of the golfer is directed to making the movement as simple as possible, so that the brain has an easier job in co-ordinating the muscles. What is needed is the conscious knowledge of the direction which the ball has to take, for the player cannot at the moment of striking make a direct observation. As mentioned in croquet, using the eyes in the horizonal plane would probably make it easier to aim, but such position with a golf club would be exceedingly awkward, counterbalancing any advantage thereby gained, and probably no one uses that method in striking. Some, in taking aim, walk up to the ball from behind and so impress themselves with a sub-conscious knowledge of the direction of the hole. Others, instead of estimating the direction to the hole, take a point in the line of vision over which the ball should travel, if it is going truly, and aim at that point. Some, again, look at the ball when they are striking, some look at the hole, but it is almost universally accepted that, in order to be able to hit the ball as desired with the golf club, it is necessary to keep the eyes fixed on the ball for reasons which have been explained. In these questions of putting it is hard to say which is the best, for there is something to be said for all methods and the player is best at the one which he has practised and he is disposed to lay down the law to advocate that method. On theoretical grounds alone, the writer would be inclined to say that, as the importance of direction takes slight precedence over that of strength in contradistinction to driving and approaching, when strength takes precedence over direction, a different style rather than a modification would be better, for undoubtedly the less complicated from the muscle point of view is the act, so much the less difficult is its control. A word about the movements a player may go through with his knees and clubs. Of course, this may be mere imitation of a learner, or it may be the unlimbering of the muscles, so that all may be free, but the writer has before suggested and is inclined to think that he is correct, that it is a means of preventing the aim and the co-ordination of the muscles from becoming stale.

Billiards.

For this game the highest physiological attributes of the eye are called into play. Judgment of distance and the distance of one ball from the other and the angle formed by the balls, or by the pocket and the ball, are matters of accurate brain judgment. It is not merely a matter of aim, which is not difficult under the favourable conditions of a billiard table, but of judgment of where to aim in order that the ball shall travel at the required angle. Among billiard players, a very great majority do not aim with one eye or the other, but with both, with the mental line of vision. Most will deny that this is the case, but it is only necessary to watch players when unnoticed to observe what is done, and the truth of the writer's observation will be apparent. On a billiard table practically only the horizontal plane has to be considered and therefore the lower the head is carried towards the cue the more is the judgment of the vertical plane eliminated. This, however, as the player becomes more experienced, becomes less necessary, and it may be that the player gradually omits to bring the chin so low. At the same time, though it may not be so necessary, habit and custom, in other words, educated muscle-sense, tend to preserve for the player the attude he has adopted during learning. The writer believes it is true that Roberts, who has marvellous judgment from mere observation of the ball, and whose muscle-sense obeys his judgment without the intervention of any special aim, stands upright and appears to hit the ball absolutely carelessly, but with astonishing accuracy. On the question of aim, too, he illustrates a point on which stress has been laid before, that, after the aim has been taken, be it direct or purely by brain judgment, it is immaterial where the player looks when actually making the stroke. This is well illustrated when Roberts, at the moment of striking, will turn his head on one side and speak to a friend without impairing his accuracy. It is often argued as to which ball the player should fix with his eyes, the object ball or the cue ball. Some good players strongly advocate one, other players the other, for an ordinary stroke. They cannot both be right that the principles they advocate are essential, but the explanation is that both are to a certain extent right, and that it is immaterial where the player looks, so long as he has practised it. This can be tested by anyone, by practising looking at the cloth between the two balls, after the aim has been taken, and then playing the stroke. It is probable that at first the player will play best with his gaze fixed where he has been accustomed to fix it, but he will be suprised to notice how little difference adopting another line of vision makes in the stroke, so long as he keeps his head still. When it is necessary to strike the ball on a particular spot, such as putting on side or screw, then it may be necessary to fix the cue ball in order to strike it accurately on the part required for the special purpose, and it is believed there is general agreement on this point. Referring to aim, there is no doubt that a player, as he becomes experienced, depends less and less on direct aim and more and more upon judgment, but it is very difficult to form a very definite idea as to the exact degree that is required. It is true that there are some who never advance from the direct aim, but they never become brilliant players. The use of ivory or composition balls, whose resistance varies and consequently the angle at which they come off, taxes brain judgment a good deal and upsets the mere aimer to a much greater extent than he who plays by judgment only.

Cricket.

Almost every detail of cricket is regulated by "Eye," bowling, batting, and fielding. To begin with the bowler, the bowler has a twofold object, in the first place to deliver the ball, as he desires, and secondly to conceal from the batsman the manner in which he is dealing with the ball. The writer does not know whether all bowlers fix their eye on the wicket in bowling, but certainly an enormous majority do so. The ultimate goal of the ball is in all cases the wickets, except when the ball is bowled for the sake of a catch. Then he desires to deceive the batsman, either by the pace of the ball or by the pitch of the ball, or by putting on a twist. In this latter case it is important to conceal from the batsman the nature of the twist which he is putting on. That excessive bowling produces staleness has been alluded to elsewhere, and overbowling, as staleness in this instance is called, is very apt to occur. The batsman's eye includes two objects, one, the perception of where the ball is going to pitch and how it is going to act after it has pitched ; and two, the appropriate moment for hitting it in any particular stroke. It is very difficult to say exactly when the batsman's judgment is formed, but probably, as regards pitching, very soon after the ball has left the bowler's hand. By observation of the bowler's fingers and wrist, the batsman attempts to make up his mind exactly how the ball will behave after it has pitched. Then another question comes in, the state of the ground, as to whether the ball is likely to rise much or shoot, for if the batsman is not prepared for these eventualities, he is of course more readily taken by surprise when they occur. In recognising the data that the eyes give him, the eyes may be used either in the horizontal plane or the vertical plane. The horizontal plane has come into increased use in recent years, and undoubtedly it should give the batsman a better conception of the behaviour of the ball in the vertical plane than does the use of the vertical plane of the eyes. Still, many adhere to the old-fashioned way of using the vertical plane, and, though the data are not so good, probably by long experience and practice the resulting play may be as good as in the case of one who uses the horizontal plane. The nearer the ball pitches to the batsman, the more difficult is the estimate for him. Presumably, too, the more the ball comes to the leg stump, the more difficult is the estimation of its pitch, for the more it comes to the leg stump, *i.e.*, along the line of vision, the more has the estimate of the pitch of the ball to be made in its vertical plane alone, but to the off and well to leg the batsman has the assistance of the horizontal plane as well. As before mentioned, the batsman forms an estimate of the flight of the ball very soon after it has left the bowler's hand, if he has correctly observed the behaviour of the wrist and fingers —he even knows how it is going to behave before it has left. If there is any uncertainty as to the direction or the degree of twist, should there be any, he is obliged to form a fresh estimate after the pitch of the ball. Again, should the ball shoot, he is obliged to modify very quickly his preconceived estimation. But not only has the batsman to form an estimate of the behaviour of the ball, but he has to make a judgment as to how best to deal with it and stimulate the co-ordinated centre to make an effective movement with the bat. This is a voluntary act ; as the batsman "gets his eye in," it becomes more a reflex and less a voluntary act. Therefore, the more the batsman's action with the bat becomes a reflex to the kind of ball he is receiving and less of a voluntary act, the better his eye is "in." There is a phrase often used by batsmen to account for the fall of the wickets or for missing the ball. It is that the "ball got on their blind spot," and this many have supposed is the moment when the image of the ball has literally fallen on the physiological blind spot of the eye. There is, of course, such a spot, but it has nothing whatever to do with this faulty estimate. There are at least two ways in which this so-called blind spot can be accounted for. One is merely a faulty estimate, the other is an absence of estimate. Now to illustrate the first way. The difference between the pitch of a half-volley and a "yorker," the writer understands, is only a slight one, and, if a ball has been well pitched up and a wrong estimate of its pitch has been made, it is easy to perceive how the ball can just pass beneath the bat in the act of striking. As to the second way, in the case of a well pitched ball, the batsman may play forward to the pitch of the ball, but if he has any doubt as to how the ball is going to behave, as to whether there is screw on it or not, he has to form a fresh judgment of the behaviour of the ball after it has pitched. In that moment of time, in which he has thrown overboard the old judgment and before he has made a new judgment, there is an actual moment of mental blindness. The same sort of thing occurs when a ball shoots and the batsman has very rapidly to play back to a ball in order to leave time for the train of thought.

The wicket-keeper is a very interesting instance of judgment. He forms an estimate of where the ball is coming, as does the batsman, very soon after it leaves the bowler's hand, his estimate being corrected as the ball approaches him. His co-ordinated motor centre responds to the reflex of his estimate on the approach of the ball. Things must be in train some time before the ball reaches his hands, because, even though it be struck away, the associated centre works as if it had not been so and his hands come together as if he were receiving the ball, there not being sufficient time after the striking of the ball to inhibit the movements for catching it. In fielding, the player has again to form judgments as the ball approaches him, and in making a catch very delicate estimation has to be made. It is said that a catch is made by getting the master eye, the hands and the ball all in the same straight line. But, of course, this is not the case, for there never was greater need for the use of both eyes in the horizontal plane in judging the exact time and position in which the ball will reach the hands. Of course, it is the act of convergence on the ball that gives the necessary subconscious brain effect which stimulates the various brain centres to execute correctly the catch. If one eye only be used, even though it be the master eye, one would lose the data from the act of convergence that is so necessary in correct performance. In throwing up the ball at the wicket, there is the same need that has been described in tennis and other games in co-ordinating the effect of the muscular movements with the line of vision. Wonderful rapidity in making an estimation or judgment is needed by those who field at point or slip, and a particular kind of temperament is required for these positions.

(*To be concluded.*)

CLINICAL MEMORANDA.

OPEN SPECTACLES OR CLOSED GOGGLES AS A PROTECTION AGAINST SNOW-BLINDNESS.

BY
S. HOLTH, M.D.
CHRISTIANIA, NORWAY.

THE note in THE OPHTHALMOSCOPE, 1914, p. 692-693, on the goggles which are to be used in Sir Ernest Shackleton's Antarctic expedition, induces me to relate in some detail what happened to Mr. Roald Amundsen, 1911-1912, in respect of protection against snow and sun.

In the spring of 1910 Mr. Amundsen showed me the appliance he had determined to use. It had been recommended to him by Dr. Frederick Cook, with whom he had served under de Gerlache on board the "Belgica" in the South Sea, 1897-1899.

Cook's goggles consist of a leather case, fixed by a leathern strap round the head (Fig. 1).

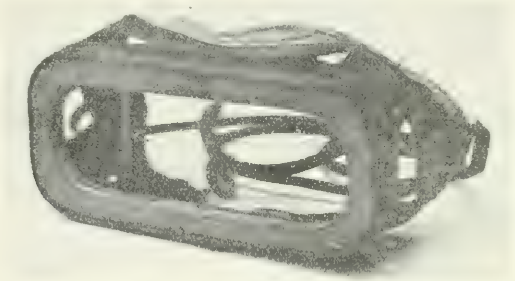

FIG. 1.

Dr. Frederick Cook's "goggles," seen from the front, used by Mr. Oscar Wisting and two other men in Amundsen's expedition, alternating with those illustrated in Fig. 2. The leather case was soaked with perspiration and came out of shape; it is therefore propped up by me with wooden sticks as used for photography; the orange-coloured glass is removed to show the leather straps to be fastened round the head in the neck.

The open front of the case is provided with a rectangular wooden frame fitted with an orange-coloured glass plate covering both eyes. The colour of this glass being disagreeable to the eye, Cook had recommended blue glass plates by way of change. I told Mr. Amundsen that I believed the shape of the goggles as well as the colour of the glasses to be unsuitable. The leather case being nearly hermetically closed down to the face, the glasses would be covered with moisture from the condensed perspiration. Mr. Amundsen thought this could be prevented by cutting out openings in the leather. I said further that the blue glass was irrational and that the orange glass did not absorb all the ultra-violet rays, which are the greatest cause of snow-blindness. I recommended to him the "Euphos" glasses of Schanz and Stockhausen. They entirely absorb the ultra-violet rays and are so light a yellow-green that the colours of the landscape, seen through them, are not much modified. I wrote to Dr. Schanz, who very kindly had a number of rectangular Euphos-B glass plates—without any smoke colour—made to fit in the frame; in the parcel was included two pairs of common spectacles with mussel-shaped Euphos glasses, about which more below

During the march to the South Pole my warnings against the leather goggles proved true. In spite of four large openings cut in the leather (see

Fig. 1), the perspiration moistened the glasses; moreover, the leather was soaked and collapsed. Cook's goggles thus proved a failure. Mr. Oscar Wisting then made for himself and for two other members of the expedition Eskimo goggles of stiff leather (Fig. 2). These proved practical; but the stenoptical slits being rather wide (10 by 30 millimeters) for the sake of the visual field, they did not protect well against sun glare and snow. Although they used alternately Cook's goggles fitted with the orange-coloured glass—not the Euphos glass—these three men were more or less troubled with photophobia and lacrymation, which did not, however, prevent them from performing their daily work.

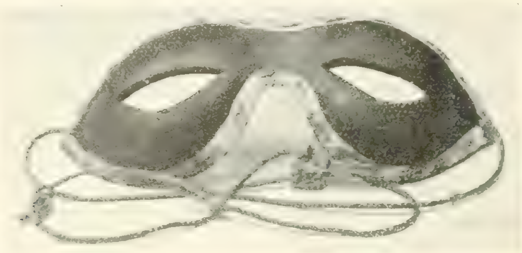

FIG. 2.

Mr. Oscar Wisting's Eskimo goggles of leather, much used by three men during the march.

Mr. Amundsen and Mr. Helmer Hansen, on the contrary, used the above-mentioned common pairs of spectacles with mussel-shaped Euphos glass the whole time. The bridge and the temples were wound with woollen thread (Fig. 3).

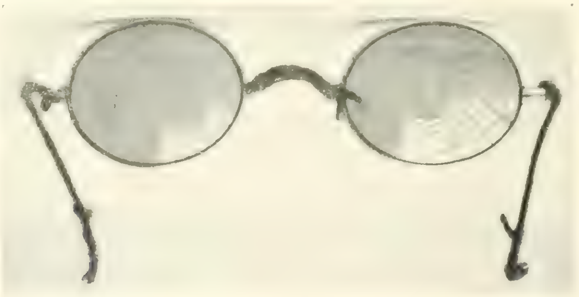

FIG. 3.

Mr. Helmer Hansen's pair of common spectacles fitted with mussel-shaped Euphos-B glasses; an identical pair was worn by Mr. Roald Amundsen during the whole march. The bridge and the temples are wound with woollen thread.

Mr. Amundsen and Mr. Hansen did not feel any inconvenience from sun glare and snow, and had not the slightest symptom of photophobia or lacrymation.

To a severer test for protection against snow-blindness spectacles cannot well be put: sun for twenty-four hours a day, snow round all the horizon, and heights up to 10,000 feet above sea. In these heights, as well known, the ultra-violet rays are much more numerous than on the sea level.

Besides the three illustrated appliances, I am also in possession of a pair of leather goggles similar to those in Fig 2, but with larger openings covered with ordinary smoke-coloured glasses, which were used by Lieutenant Prestrud and his two companions in the expedition to King Edward's Land.

These goggles were naturally much better than nothing, but did not afford complete protection against lacrymation and photophobia. The glasses often became moistened.

I demonstrated all the foregoing appliances before the members of the Norwegian Medical Society, 25th September, 1912 (*Forhandlinger*, pp. 135-136), where I advocated open spectacles.

The goggles with metal wire mask, intended for Sir Ernest Shackleton's men (*loc. cit.*), are, it is true, not hermetically closed ; but I am not sure that they will prevent moistening of the glasses with the perspiration of strong working men.

According to the experiences of the Amundsen expedition, and to those related to me by ski-runners in the Norwegian mountains during spring time, I believe I can lay down the following rules for protection against snow blindness in Arctic, Antarctic, and sporting expeditions.—(1) All more or less hermetical arrangements of goggles for the exclusion of side lights are superfluous, and serve only to moisten the glasses. (2) The best frame is the common open spectacle frame, which should be fitted with large mussel-shaped "Euphos" glasses.

P.S.—After the above article was written, my colleague Dr. P. W. K. Böckmann (of Christiania) confirms entirely my views from personal experience in the Norwegian ski expedition in Spitzbergen in the summer of 1912, to rescue the survivors of the Schröder-Strantz expedition. I had recommended to him the mussel-shaped Euphos B glasses, which were consequently worn by all members except one, a Laplander. The latter suffered seriously from snow-blindness. Most of the members wore their Euphos glasses in closed goggles with metal wire mask with a velvet-lined border ; ski-ing up hills they had to remove the goggles because the glasses were moistened. These men did not suffer from snow-blindness, but the epidermis of the eyelids was soaked by perspiration, thus producing conjunctivitis.

Dr. Böckmann himself used the Euphos B glasses in open spectacles, and had no trouble from his eyes.

COLOUR SENSE IN RELATION TO NERVOUS STAMMER.

BY
George Henry Taylor,
MEDICAL OFFICER N.S.W. GOVERNMENT RAILWAYS AND TRAMWAYS.

During the past seven years, 60,000 candidates for employment in the railway service of this State have been examined in this office, the examination in each case including a test for colour sense by Holmgren's wools and the Williams' lantern, and during the past five years by the modified Williams' lantern. ·18 per cent. of these candidates had a nervous stammer sufficiently in evidence to impair their usefulness as railway servants, and to cause them to be rejected. I can recall no instance in which a man rejected for a nervous stammer was also found to be red-green blind. During the past three years, I have carefully watched for such a combination. There is a complete record of all cases examined in this office. In one case only was a man rejected for defective color sense who also had a nervous stammer. He was normal by Holmgren's wools, but he named pale-green "white" in the lantern. Unfortunately at that time I had no knowledge of the value of either Stilling's or Nagel's test, and therefore cannot state the real value of his colour defect.

From this evidence it is at least probable that a nervous stammer is much rarer in colour blind persons than in colour normal persons.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—PHYSIOLOGY.

(1) **Krauss, W.**—On the relationships of the sympathetic to the visual organ. (Ueber die Beziehungen des Sympathikus zur Sehorgan.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1912.

(2) **Siven, V. O.**—The rods as colour-perceptive organs. *Archives of Ophthalmology*, March, 1913.

(3) **Reichen.**—Experimental researches upon the action of ultra-red rays upon the eye. (Experimentelle Untersuchungen über Wirkungen der ultraroten Strahlen auf das Auge.) *Zeitschrift für Augenheilkunde*, Januar, 1914.

(4) **Angelucci, A.**—The nutrition of the eye. (Sur la nutrition de l'œil.) Actes du XII Congrès International d'Ophtalmologie. Tome I. Petrograd, 1914.

(5) **Macnab, Angus.**—The physiology of vision and fusion. *Birmingham Medical Review*, August, September, and October, 1914.

(1) **Krauss**, of Marburg, first points out that although there is a general similarity, with however definite variations, in the anatomy of the smooth musculature of the orbit in cats, dogs, and rabbits, there is a marked dissimilarity between the same structures in these animals and in apes. The smooth muscle system of the orbit in apes (*Cercopithicus* and *Rhesus*) is like that of man. The author has come to this conclusion after making serial sections in three planes of the orbits of these animals. These anatomical differences are associated with a corresponding difference in function. Krauss investigated the question by observing the alteration in position in the globe caused by stimulation of the cervical sympathetic. The movements of the globe were registered on sensitised paper which was exposed to a beam of light reflected from a mirror attached to the eye by means of a Masey's capsule. The exophthalmos caused is slight in the rabbits, more in the cats, and most in the dog. The effect upon the ape's eye is minimal. If the lids were removed, the effect was intensified, showing that the smooth muscles in the lid had nothing to do with the exophthalmos produced. The ordinary phenomena of excitation of the sympathetic were present, enlargement of the palpebral slit, mydriasis, lowering of the intra-ocular tension, contraction of the vessels of the ear and of the retina, increased lacrymation, and erection of the hair. T. HARRISON BUTLER.

(2) **Siven**, of Helsingfors, considers that the rods are not colour-blind, but are concerned in the perception of colours of short wave lengths, *e.g.*, blue and violet. As proof of his theory, he points to the following facts.—Hemeralopes, in whom there is a disturbance of the visual purple of the rods, are usually blue-blind; and Purkinje's phenomenon is not present in them. Purkinje's phenomenon does not occur in the fovea where there are no rods, so that instead of the perception of blue remaining when all other colours have faded under the increasing dimness of light, not even this colour can be perceived, when the

fovea alone is being used. In santonin poisoning, in which there is a disturbance in the formation of the visual purple, central vision for about 8° to 10° around the fixation point is white, while peripheral vision is yellow, because there is violet blindness, and the complementary colour, *viz.*, yellow-green, alone appears. A similar condition is produced in jaundice, and as the visual purple can only be dissolved from the rods by the biliary salts, it is supposed that these salts circulating in the blood have dissolved the visual purple and thus interfered with violet vision. In hepatic disease, from a similar cause, hemeralopia is not uncommon. In nocturnal animals, which are well supplied with visual purple, and in which there are scarcely any cones, the short-waved colours are seen almost as well as they are by the human eye, but in day animals which have no visual purple, violet, blue, and bluish-green rays seem unable to excite the retina. The day birds are also hemeralopes. The normal colour fields also show that the rods are better adapted for blue vision, since the field for blue is larger than that for red or green. The dim spectrum has been said to be colourless, but it is really bluish, and a colour-blind person, *i.e.*, one who sees the whole spectrum as one colour, and who should therefore more correctly be called a monochromatic person, probably sees the same bluish colour that a healthy person sees with the dim spectrum.

ROSA FORD.

(3) **Reichen**, of Aarau, after summarizing the work of Widmark, Birch-Hirschfeld, and others, upon the effect of ultra-violet rays upon the eye, points out that these experimenters failed adequately to filter out the rays in question.

Voigt has shown that a water filter of one or more centimeters in thickness is not an adequate agent. Hertel proved that water allows rays of 2000 μ wave length to pass partially Voigt succeeded in causing severe conjunctivitis in rabbits by exposing their eyes to rays of this wave length. The author isolated the ultra-red rays by using a prism of common salt, or alternatively absorbed the rays by an opaque solution of iodine in carbon bisulphide (*Jodschwefelkohlenstofflösung*), and then passing them through water and concentrating them with a lens of common salt. The source of light was a flaming arc. The rabbits were narcotised by the subcutaneous injection of ether.

The author found that the ultra-red rays caused an irritation of the iris, indicated by contraction of the pupil which lasted some hours. The conjunctiva showed only slight signs of irritation. No changes were seen in the lens or retina. T. HARRISON BUTLER.

(4) In an interesting review of some thirty pages, **Angelucci**, of Naples, deals with the phenomena of intra-ocular exchange, the physical and chemical properties of the aqueous, the rate of its production, the factors which influence its secretion, and the pathological disturbances of these phenomena. Under the head of the physical and chemical properties of the aqueous, attention is drawn to recent researches into its molecular concentration or osmotic pressure, its electric conductivity, its viscosity, etc., researches for which we are chiefly indebted to Italian observers. Among the factors whose effects in modifying the constitution and properties of the aqueous are discussed, we find paracentesis, the application of mydriatics, myotics, anæsthetics, and other drugs, cauterisation of the cornea, subconjunctival injections, irritation of the cervical ganglion, sympathectomy, and states of the fifth nerve. The paper then touches on the passage of antibodies into the aqueous, and the nutrition of the cornea, lens, uvea, and retina.

Discussing the rate of exchange of the aqueous, Angelucci accepts the statement of Leber and Niesnamoff, that this amounts to 5 cub. mm. per minute. His view as to the mechanism of the formation of the aqueous is that in the ciliary body lymph leaves the vessels by a process of transudation, which includes both filtration and diffusion, and that the lymph so formed is converted into aqueous by a quantitative change produced by the epithelium of the ciliary processes. A. J. BALLANTYNE.

(5) **Macnab,** of London, discusses the physiology of vision in a series of clear and very readable articles, in which the latest work on the subject is set forth both simply and attractively. The papers are well worth perusal, but obviously do not lend themselves to abstraction. R. H. ELLIOT.

II.—IMPAIRED RETINAL ACTIVITY.

Berry, George A.—The causes and symptomatology of impaired retinal activity. *Lancet*, October 25th, 1913.

As **Berry**, of Edinburgh, states in the opening paragraph of his introductory lecture at the Royal Eye Hospital, London, the ground which is covered in the lecture is largely familiar. At the same time it may be said that this ground has seldom seemed so easily traversed by the reader. The relationships existing between the form-sense and the light- and colour-senses, as these are of importance in the oculist's everyday work, are brought out in a logical manner, which tempts one to transcribe the steps of the arguments. The result would occupy too much space. Therefore it is better to quote the author's conclusions, and to leave the reader to study the arguments themselves in the original.

"We have seen that, physiologically, when the intensity of a light stimulus, acting only on a few end organs of the retina, is diminished in any way—that is, when either the brightness of the test object or the contrast between it and its background is diminished—then the visual acuteness, the power of recognising detail, is lowered. And for diminished intensity of stimulus in the case of the normal eye, we have assumed diminished excitability, conductivity, or receptivity in that of the diseased eye. *A priori* the result must be the same in both cases.

"That the assumption is justifiable is shown by the fact that in every case of acquired visual defect, with obvious exceptions, the light sense for small visual angles is diminished. As this is not necessarily the case for larger visual angles, it follows that a summation of feebler individual impressions must have the effect of causing a stronger total impression. We have found that both the light and colour senses are greatly dependent upon the size of the angle under which any object is seen. The eye is unable to detect anything like as small differences in the intensities of contiguous retinal stimuli under a small, as it does under a greater, visual angle. And this circumstance, when taken along with the physiological imperfection of the retinal images of external points, is the reason why visual acuteness is greater in what we call a good light than it is in a sufficiently bad light. Thus is explained the drop in acuteness which takes place, physiologically, in the dark—a drop which is, however, greatly modified by retinal adaptation. Thus also is explained the drop which takes place, pathologically, when the excitability or conductivity of the nervous mechanism is lowered. And it is obvious that, given normal optical conditions of the eye, a diminution of visual acuteness must depend upon some change in the retina, or its direct connections.

"I have left out of consideration those visual defects which come from optical errors alone. The explanation of these is simpler. The diffusion circles of the images of objective points are of quite another nature than those which are due to aberration. It is interesting, however, to note in connection with the subject of the lecture, that, as a rule, the visual acuteness of an ametrope is relatively better when compared with that of an emmetrope when the light is insufficient to permit of full vision in the case of the latter. This is due, of course, to the absence, generally speaking, in the ametrope, *quâ* his ametropia, of any light sense defect.

"Finally, as regards the methods of examination, we have seen that for foveal vision it is easier, and, for clinical purposes, sufficient, to test the acuteness for Snellen's types under ordinary and reduced illumination and contrast, than to determine the limits of invisibility with the photometer and Masson's disc. We have seen further that similar tests are not suitable for examination of eccentric vision, and that an estimate of visual acuteness at other parts of the retina than the fovea, must be made with objects which subtend a very small visual angle." S. E.

III.—OPHTHALMOLOGY AND GENERAL MEDICINE.

(*Second Notice.*)

(1) **Stock, W.—Retinal hæmorrhages in miliary tuberculosis. (Ueber Blutungen in der Retina bei Miliartuberkulose).** *Klin. Monatsbl. f. Augenheilkunde*, Januar, 1914.

(2) **Kambe, Toshiro.—Choked disc in leukæmia and yellow coloration of the fundus oculi due to a lymphoma of the choroid. (Ueber Stauungspapille bei Leukämie und Gelbfärbung des Augenhintergrundes durch ein Lymphom der Chorioidea.)** *Klin. Monatsbl. f. Augenheilkunde*, Januar, 1914.

(3) **Kimball, Arthur H.—Voluntary displacement of the eye.** *Jour. Amer. Medical Association*, April 4th, 1914.

(4 **Efferstein.—A contribution to our knowledge of necrosis of the lids. (Zur Kenntniss der Lidnekrosen.)** *Zeitschrift für Augenheilkunde*, Juli, 1914.

(5) **Batten, F. E.—Family cerebral degeneration with macular change.** *Quarterly Journal of Medicine*, July, 1914, and *Medical Chronicle*, September-October, 1914.

(6) **Smyth, R. Osborn.—Myasthenia gravis: a short account of the disease, with notes on three cases.** *Dublin Journal of Medical Science*, October, 1914.

(7) **Birt, Arthur.—Vascular crises and angiospasm.** *Canadian Medical Association Journal*, October, 1914.

(8) Hawthorne, C. O.—The ophthalmoscope in general and medical practice. *Medical Press and Circular*, November 11th, 1914.

(9) Cameron, James.—The ophthalmoscope in general and medical practice. *Medical Press and Circular*, November 25th, 1914.

(10) "Reflector."—The ophthalmoscope in general and medical practice. *Ibidem*, December 2nd, 1914.

(1) Axenfeld and Stock have already expressed the view that certain cases of hæmorrhagic retinitis in which the veins in the neighbourhood of the hæmorrhages are accompanied by white sheaths, are of tuberculous origin.

In the case here reported by **Stock,** of Jena, miliary tuberculosis was suspected, but the author hesitated to make this diagnosis on account of the presence of retinal hæmorrhages which seemed to point to a septic blood infection. Just before death, however, choroidal tubercles appeared, and the *post-mortem* examination confirmed the diagnosis of miliary tuberculosis. In sections of the eye, tubercle bacilli were found in the choroidal tubercles, but not in the retina. The author concludes that the retinal hæmorrhages are due to vascular changes set up by tuberculous toxins in the blood. The only hint as to the nature of the vascular lesion was obtained in one artery, which showed erosion of the endothelium and of the other tissues of the vessel wall at the point where blood had broken through. A. J. BALLANTYNE.

(2) **Kambe,** of Nagoya, from a study of the literature, gathers that the fundus changes noted in leukæmia include yellow coloration of the fundus, paleness of tint in the retinal veins, dilatation of the veins and occasionally visibility of the blood stream, retinal hæmorrhages, and sometimes white areas associated with hæmorrhages. Occasionally the picture resembles that of albuminuric retinitis. Choked disc is a rare complication, but was present in his own case, of which he is able to give clinical, *post-mortem*, and histological details. The patient was a girl ten years of age. She presented hæmorrhages in the skin and mucous membranes, and swelling of the cervical glands and spleen. The fundus showed retinal hæmorrhages, yellow coloration, and paleness of the veins. The case progressed with very rapid fall in the number of erythrocytes and in the percentage of hæmoglobin, and soon proved fatal.

The *post-mortem* examination confirmed the diagnosis of lymphatic leukæmia, with enlargement of lymph glands, thymus, spleen, etc. Microscopic examination of the eye showed lymphocytic infiltration of the conjunctiva, sclera, choroid, optic nerve sheaths, orbital tissues, etc., the cells being most densely gathered round the blood-vessels. The choroid was thickened from heaping-up of round cells, and the author thinks that the yellow colour of the fundus would be explained by the cellular infiltration of the choroid. The choked disc is put down as a mechanical result of slowing of the blood stream due to the blood changes. Interference with the venous circulation would lead to dilatation of the veins at the expense of the neighbouring lymphatic channels, and the rigidity of the scleral ring, through which the optic nerve passes, would, no doubt, play a part in the strangulation of the lymphatic circulation which led to the choked disc. A. J. BALLANTYNE.

(3) **Kimball** reports the curious case of a soldier affected with dementia præcox, an inmate of the Government Hospital for the Insane at Washington, D.C. By dint of some months' practice, the patient gradually became able to displace the left eyeball in the way depicted in the two accompanying figures.

The process was painless. The left optic disc was atrophic. There were no other changes in the eye. The patient made no attempt to displace the right eyeball, but the other one had become, as it were, his plaything.

SYDNEY STEPHENSON.

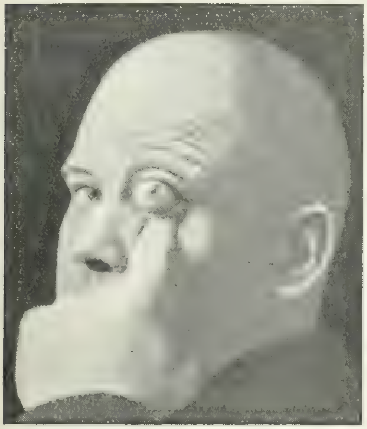

Fig. 1.

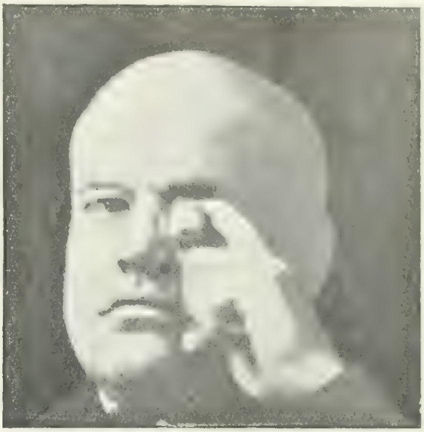

Fig. 2.

(4) **Efferstein,** of Marburg, states that many cases of "tissue death" in the eyelids have been recorded, and generally the morbid process has been called a "gangrene." This is a misnomer, because the word postulates infection with putrefactive organisms. These are rarely present. The process is a necrosis, and may be caused by:

(1) Mechanical, chemical, and thermal noxa.

(2) Increase in a local lid disease or a secondary infection (eczema impetigenosum).

(3) General or local diseases.—Influenza, measles, scarlatina, typhoid, small-pox, chicken pox, erysipelas, endometritis, whooping cough, empyema of the frontal sinus, bacillus of malignant œdema, anthrax, and streptococcal infection.

(4) Defective nutrition, as, for example, in syphilitic endarteritis and diabetes.

(5) Neurotrophic processes.

The author describes three cases in which the necrosis was due to pyogenic organisms. In one case there was a strong suspicion that syphilis played an important part in the pathological process. T. HARRISON BUTLER.

(5) An account is given by **F. E. Batten** (London), of a family of five children, three of whom were affected with a progressive disease leading to dementia, blindness, and paralysis, one of whom showed changes in the macular region of the eyes. The children were healthy at birth and developed in a normal manner till the age of $3\frac{1}{2}$ years. Epileptic fits then occurred and they began to degenerate. They became noisy, dirty in habits, and developed a spastic condition of the limbs. Death ensued in the one child at the age of eight, in the other at four, and in the third child at six years. All three of these children have died, and in two a *post-mortem* has been performed. In one case no change was visible in the nervous system macroscopically, in the other only slight atrophy, but on microscopic examination, diffuse degenerative changes affecting the ganglion cells were visible in the cerebrum, cerebellum, and spinal cord. The Wassermann reaction of the blood and cerebrospinal fluid was negative in both cases, and no change in the brain or membranes was found suggesting congenital syphilis.

It is clear from a consideration of these cases and of those which have been described by Vogt, Bielschowsky, and others, that there is a form of familial degeneration which occurs at a later age, has no race proclivity and somewhat different clinical manifestations from that described by Waren Tay and Sachs under the title of " Family Amaurotic Idiocy." The typical features in these cases are *loss of intellectual faculties, loss of vision, loss of motor power.*

In some cases all three defects seem to start together and run an equal and concomitant course. In other cases the mental symptoms first appear, the visual and the motor symptoms remaining long in abeyance.

In other cases, again, the visual symptoms appear first, motor and mental symptoms following later or not at all. In some cases the degeneration begins in early life, in others in later infancy, in others, again, in early youth. Some cases pass rapidly to a fatal termination, others are slow in their progress.

Some cases show very distinct changes in the macula, others pigmentary changes in the retina, which are not limited to the macula. Others, again, show no fundus change, or do so only in the later stages of the disease.

Clinically, there is a great variation in the symptoms, and this, together with their time of appearance, forms a basis for classification. Pathologically, these cases are essentially the same, and the changes in the cells are strikingly similar in all cases which have come to autopsy.

JUDSON S. BURY.

(6) **Smyth**, of Dublin, gives a concise account of myasthenia gravis, a disease first mentioned in England by Wilks in the year 1877. It is characterised by weakness of various muscles, which quickly become exhausted by use and just as quickly restored by rest. It tends to affect the musculature of the eyelids, orbit, mouth, tongue, and palate. The affected muscles manifest a definite electrical reaction, the " myasthenic reaction." Patients frequently consult a medical practitioner because of their inability to hold the eye open, especially of an evening. The ptosis, when bilateral, is generally more marked on one side than the other. It is accompanied by paresis of the orbicularis and occipito-frontalis muscles, so that the eye cannot be kept closed against pressure. Nystagmoid movements are occasionally seen. Strabismus and diplopia are common, and are usually due to weakness of the superior and external ocular muscles. Difficulty in mastication is common, and in extreme cases the mouth cannot be closed against the force of gravity and hangs slightly open. Speech may be impaired. The ptosis, the semi-opened mouth, the back-tilted head, and the loss of wrinkles in the skin give a vacuous look to the face, which, when seen, is quite typical of the disease Atrophic changes in the affected muscles are quite exceptional. Bladder and rectum are never affected. Superficial and tendon reflexes are normal, although in some cases the knee-jerk can be exhausted by repeated tapping. The disease fluctuates in a curious way. In advanced cases the gait may be of a waddling character, while the legs are liable to give way without warning. The commonest mode of death is by respiratory failure. Lung trouble almost invariably proves fatal when it occurs in cases of myasthenia.

The most striking feature about the morbid anatomy is the absence of any pathological change competent to cause the symptoms observed during life. Whether the so-called "lymphorrhages" (Farquhar Buzzard), found *post-mortem* in a fair proportion of cases of myasthenia, have any direct influence upon the production of the disease, it is impossible yet to say. Almost all observers are agreed that myasthenia is of toxic origin.

Diagnosis is usually simple. To quote Smyth's words :—"The paresis and easily induced fatigue, recovering quickly after rest, the myasthenic reaction, together with the fluctuating nature of the symptoms, the absence of atrophy, and rarity of sensory loss, form an easily recognised group."

The subject of myasthenia may survive from a few weeks up to fifteen years or more. Death is the usual issue. The author has found tuberculin useful in one case.

Of the three cases described by Smyth, one is of interest to ophthalmic surgeons especially, since the eyes were alone affected. The facts were, in abstract, as follows.—A female, aged 38 years, in April, 1913, suffered from "inflammation" of the eyes, after which she observed a drooping of both upper lids, more pronounced towards the end of the day. In March, 1914, she developed diplopia as well. On examination, ptosis of the right eye, together with paresis of the superior rectus. The patient was otherwise well, not tiring readily. Under three months' treatment by tuberculin, the ptosis disappeared, and there was no diplopia, except when she tried to move the eyes in an upward direction. Power in the occipito-frontalis was normal. General health now excellent. SYDNEY STEPHENSON.

(7) **Birt**, of Halifax, N.S., in the course of a communication dealing with localised vaso-constriction as a cause of many physical phenomena, such as migraine, epilepsy, the transient hemiplegias, monoplegias, and aphasias, mentions the case of a woman, 30 years of age, who suffered from valvular cardiac disease of long standing. Within four years she had been affected with about thirty "blind turns," which always occurred at night, awaking the patient suddenly from sleep. She then found that she was more or less completely blind of one eye. The sight, on an average, returned in from two to ten minutes. Recovery could always be hastened by the adminstration of a rapidly acting nitrite. On one occasion Birt was able to examine the fundi during the brief period of unilateral blindness. He then found that the fundus of the right or affected eye was markedly pale and blanched as compared with the left, and that the branches of the retinal arteries were thread-like. These ophthalmoscopic appearances disappeared with restoration of sight. SYDNEY STEPHENSON.

(8) **Hawthorne**, of London, enters a vigorous and logical plea for the routine examination of the fundus oculi in every case of illness, and he further maintains that the family medical practitioner should be prepared to undertake the examination. Hawthorne replies very effectually to those who have criticised his standpoint. SYDNEY STEPHENSON.

(9) **Cameron**, of Edinburgh, points out how the use of the ophthalmoscope has been widened now that 79 per cent. of the population dwell in towns, and that incandescent gas or electric lighting has become common even in the homes of the working classes. The pocket electric flash light, too, can be employed for the direct method of ophthalmoscopic examination.

SYDNEY STEPHENSON.

IV.—THE SPIROCHÆTA PALLIDA.

Birt, C.—The best method of staining treponema pallidum. *Journ. Royal Army Medical Corps*, March, 1914, p. 261.

A disadvantage in a few of the various methods of staining the *Spirochæta pallida* of syphilis is that the dye or Indian ink or the silver preparation generally works best when the material obtained is quite fresh, and in some cases moist and not yet dry; under many circumstances, however, it is necessary to deal with films which have been dried and sent by post, and in this connection Fontana's method of staining them has proved to be one of the best. **Col. C. Birt** gives it as his opinion that this method of staining the *Spirochæta pallida* is destined to be of great value on this account, especially to those who have to diagnose syphilis in places remote from a laboratory. He states that the detection of the *Spirochæta pallida* in a film stained in this way is accomplished more easily and quickly than the discovery of a parasite in a film of malarial blood, so that the prompt recognition of an infecting sore is within the range of everyone. He describes the method in detail as follows:—

"The films of the suspected material are dried in air; they must not be fixed by heat. Huge's fluid, which consists of 1 cubic centimetre of acetic acid, 20 cubic centimetres of formalin, and 100 cubic centimetres of distilled water, is poured over them, and is renewed several times in the course of a minute. After washing with water they are treated with the mordant, which is a 5 per cent. solution of tannic acid in a 1 per cent. watery solution of carbolic acid. The slide covered with the mordant is heated till steam arises, left for half a minute, and then washed with water for fifteen to thirty seconds. Without drying, the silver stain is next applied. This is a $\frac{1}{4}$ per cent. solution of silver nitrate in distilled water to which ammonia has been added with a capillary pipette until a slight turbidity is evident. If excess of ammonia is introduced, the fluid becomes clear again, and is useless for staining purposes; a trace of ammonia is all that is required. This silver solution is poured on the slide, which is heated till steam is given off, and left for half a minute. The slide is then washed with water, dried with blotting paper, and mounted in xylol balsam if permanent preparations are desired, since cedar oil soon causes the spirochætes to fade. The jet black treponemata stand out prominently on the clear background, and appear to be much thicker than when stained with aniline dyes. They may be identified with the one-sixth objective. They attract the attention immediately, so that if they are present in the film they can be detected in a few seconds or minutes. It is not necessary to be accurate in the strength of the silver nitrate solution; a crystal of the salt dissolved in two or three cubic centimetres of distilled water in a test-tube to which is added a minute drop of ammonia from a capillary pipette, gives satisfactory results." *Journ. Clinical Research*, May, 1914.

V.—THE CRYSTALLINE LENS.

(1) Clausnizer, Th.—The weight of human lenses in unbroken capsule. (**Weitere Ergebnisse von Wägungen der in geschlossener Kapsel entfernten menschlichen Linse.**) *Centralbl. f. prak. Augenheilkunde*, September, 1911.

(2) Attias, G.—Vesicles in the lens and lenticonus. (**Blasen in der Linse und Lentikonus.**) *Klin. Monatsbl. f. Augenheilkunde*, November, 1911.

(3) Van der Hoeve.—The heat produced by intumescence of the lens substance. (**Die Quellungswärme der Linsensubstanz.**) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911.

(4) **Jess, Adolph.—On the chemistry of senile cataract.** *Archives of Ophthalmology*, January, 1913.

(5) **Rollet and Genet.—Milky cataract opened spontaneously into the anterior chamber. (Cataracte laiteuse ouverte spontanément dans la chambre antérieure.)** *Revue Générale d'Ophtalmologie*, 31 janvier, 1913.

(6) **Elschnig and Zeynek, R. von.—Black cataract. (Cataracta nigra.)** *Zeitschrift für Augenheilkunde*, Mai, 1913.

(7) **Dudley, W. H.—Absorption of the lens nucleus in a patient aged sixty-six years.** *Ophthalmology*, July, 1913.

(8) **Holloway, T. B.—Unusual type of cataract.** *Ophthalmic Record*, August, 1913.

(9) **Hudson, A. C.—Double coloboma of lens with peculiar lens opacities.** *Transactions Ophthalmological Society U.K.*, Vol. XXXIII, 1913.

(10) **Hudson, A. C.—Ring-shaped marking at the posterior surface of each lens.** *Transactions Ophthalmological Society U.K.*, Vol. XXXIII, 1913.

(11) **Clegg, J. Gray.—A case of senile cataract with two nuclei.** *Transactions Ophthalmological Society U.K.*, 1914.

(12) **Coats, George.—Hernia and rupture of the early lens vesicle.** *Royal London Ophthalmic Hospital Reports*, Vol. XVIII, part II.

(13) **Drualt-Toufesco.—Some reflections on the normal and pathological lens. (Quelques réflexions sur le cristallin normal et pathologique.)** *Ann. d'Oculistique*, février, 1914.

(1) In continuation of the work of Grunet on the subject of the weight of human lenses, **Clausnizer**, of Tübingen, has collected from the local clinic some 94 lenses which had been removed with intact capsules. They consisted mostly in dislocated lenses, congenital and Morgagnian cataracts, and one lens which presented in the course of an operation for glaucoma. The average weight of the whole 94 lenses is 0·216 gr. The lowest was a dislocated congenital cataract of a boy of 7 years 0·055 gr., and the highest an unripe secondary cataract 0·230. The average of uncomplicated, unripe cataracts was 0·237 and of ripe cataracts 0·216.

Unripe complicated cataracts 0·235 and ripe complicated cataracts 0·211. The average of all kinds of unripe cataracts is 0·236 and of all kinds of ripe cataracts 0·213. Dislocated lenses with opacities weigh, on the average, 0·183 and clear dislocated lenses 0·227. Average of myopic eyes is 0·234 of hyperopic eyes 0·218 and of emmetropic eyes 0·216.

The average diameter of such lenses as were measured (50) is 8·69 mm. and the thickness 4·58 mm. A. LEVY.

(2) In the case described by **Attias**, of Munich, when the pupil was illuminated from a distance of half a metre, two round spots were observed in the lens, apparently near the centre of the posterior surface, and best described as "like drops of oil in a red fluid." Through each of them a much reduced view of the fundus could be obtained, which seemed to move in the direction opposite to the head of the observer. The spots presented somewhat different appearances when viewed by the magnifying *loupe*, by focal

illumination, and under illumination with the Sachs' lamp. It was determined that the spots were due to round bodies, probably vesicles, *in* the lens and not on its posterior surface. Attias points out that in all published cases of lenticonus posterior, the appearances have been compared to that of a drop of oil in water, and he raises the question whether it is certain that in all these cases there was a true projection on the posterior surface of the lens. It would be well to employ the different methods of examination mentioned, in order to exclude conditions like the one he describes, before making the diagnosis of lenticonus posterior.

He describes two other cases, one of which he believed to be a case of true lenticonus posterior, while the other closely resembled the case first described. A. J. BALLANTYNE.

(3) **Van der Hoeve,** of Utrecht, has by means of the bolometer and an ice calorimeter, been able to measure the heat produced when dried ox lens substance is placed in water, in aqueous humour, or in vitreous humour. The heat produced was in all three casesa bout the same. Each gramme of desiccated lens produced about 12 calories. T. HARRISON BUTLER.

(4) Of all the amino-acids in albumin, cystein alone becomes red with sodium-nitro-prusside and ammonia. From this fact, **Jess,** of Giessen, argues that the lens which does not give the nitro-prusside reaction has lost its cystein. Reiss found that a normal lens gives the reaction equally in all parts, but a senile cataractous lens gives it either only partially or not at all; a hypermature cataract is entirely negative, while an immature cataract is positive in the cortex and sometimes in the nucleus, a mature cataract is slightly positive in the cortex and less so *in the nucleus, or entirely negative.* A traumatic cataract reacts exactly as a normal lens. Jess has confirmed these results in experiments on 120 cows' and 36 human lenses, and finds that in a non-cataractous senile lens, the reaction is positive equally in all parts. The absence of the nitro-prusside reaction is not then due to senile, but to cataractous, changes. Jess finds that it is the soluble part of the lens which gives the nitro-prusside reaction and not that part which he finds to be insoluble. It is therefore the loss of the soluble albuminous material of the lens, and in particular its contained cystein, which accounts for cataract. Whether this is due to an abnormal increase in the transformation of the soluble into the insoluble albuminoids of the lens, a change which Mörner states occurs to a certain degree physiologically throughout life, Jess leaves to further investigations. ROSA FORD.

(5) The commencement of the case reported by **Rollet** and **Genet,** of Lyons, was not seen by them. The patient, who had had one cataract removed by operation, had evidently had a cataract also in the other eye, probably for many years. The history showed that, as the result of a fall nearly two years before coming under observation, there had been some eye symptoms. Twenty-one months later, there was an attack of violent pain in the head followed by loss of vision. The patient was then seen by the authors, who found the eye glaucomatous and the anterior chamber filled with lens matter. Under the influence of myotics, the glaucoma subsided, and the lens matter became absorbed. ERNEST THOMSON.

(6) **Elschnig and Zeynek,** of Prague, have made chemical and spectroscopic examinations to try and determine the nature of the pigment in black cataract. They came to the conclusion that it is not derived from hæmoglobin. It belongs to that ill-defined group of pigments known as "lumins" or "melanins." The literature of the subject, which is not extensive, is reviewed. T. HARRISON BUTLER.

(7) **Dudley,** of Los Angeles, had a patient, a man aged 66 years, suffering

from injury to the eye by an explosion. A number of particles of quartz were imbedded in the cornea, which was the seat of several foci of infection. The lens was cataractous and swollen. Lens matter began to appear in the anterior chamber a month afterwards, and absorption continued until, nearly a year later, there was total disappearance of the lens. Vision, with correction, was 20/40 and No. 1 Jaeger. He thinks the rupture of the lens capsule in this case would be due to concussion and not to penetration.

A. J. BALLANTYNE.

(8) **Holloway,** of Philadelphia, describes several cases of familial, and probably congenital, cataracts in which the main mass of opacities assumed dot or punctate form which appeared bluish on focal illumination (*cataracta coerulea congenita*). In addition to these punctate opacities in the cortical layers, intensified opacities were visible near the anterior and posterior poles, but the nucleus was not involved.

J. JAMESON EVANS.

(9) **Hudson,** of London, describes the clinical appearances of an eye in which the lens presented two colobomata, the one upwards and inwards, the other, and larger, downwards and outwards. Deeply situated in the body of the lens, was a small dense-grey shell of opacity with its concavity centrally directed, so as to embrace the equator of that part of the lens which lay central to it. The patient's other eye had visual acuity 6/5 after correction and was presumably otherwise normal, although the author does not expressly state so.

ERNEST THOMSON.

(11) In operating upon a cataract of the hard dark-brown variety, **Clegg,** of Manchester, had the perhaps unique experience of seeing a second nucleus, about as large as the first, follow the latter out of the eye. The one nucleus, supposed by Clegg to be the anterior, was exactly plano-convex. The other, supposed to be the posterior, was in the form of a positive meniscus, with a small elevation at the centre of the concave suface. Clegg regards the nuclei as being formed contemporaneously.

In the discussion Treacher Collins suggested a different explanation. In a case described in 1890 (Vol. X of *Transactions O.S.*), he had found, on anatomical examination, a band of degeneration running transversely across the nucleus of the lens, from side to side, splitting it definitely into two. It was thus divided into two plano-convex bodies, one lying in front of the other, such as Clegg had found in his case. Collins believed that a similar condition in a cataractous lens had since been recorded elswhere : (no reference is given).

ERNEST THOMSON.

(12) In this paper **Coats,** of London, describes the rudimentary eyes of a four weeks' human embryo, in which he found, in the left, the lens vesicles open to the surface, and the epithelium and basement membrane well formed, but the latter was evaginated backwards to form a cavity. The central cells of the lens vesicle had become degenerate, and fallen back into this sac, and had the appearance of the Morgagnian globules seen in the degeneration of adult lens fibres. The primary optic vesicle was not yet invaginated. In the right eye, there was rupture of the lens vesicle, but no hernia, the vesicle being almost entirely closed, and its posterior cells lengthening. Coats then discusses the possibilities if the embryo had reached maturity, and points out that this case supports the statement of E. T. Collins, that a protrusion at the posterior pole of the lens may occur, apart from swelling of the lens fibres, or traction of the hyaloid artery or its mesoblast. This case also gives proof to the possibility of certain forms of cataract, such as the "discoid" and "disc-shaped," being due to suppression or disease of the cells which should give rise to the lens nucleus.

A. H. PAYAN DAWNAY

(13) **Drualt-Toufesco** considers that the lens should not be regarded merely

as the organ of accommodation and a refractive medium of the eye, but that it is, above all, a glandular organ proportionally comparable to the liver or one of the endocrine glands, the activity of which is chiefly important during the embryonic period. She records a number of observations on the lenticular cells of embryonic and adult humans, cats, and rats, and also on pathological human lenses, which, in her opinion, show that every cataract has its orgin in an alteration of the lenticular cells, which are influenced by every intra-ocular disturbance, whether of local or general origin. The microscopical appearances of all varieties of cataract are similar, but she considers that congenital cataracts differ from those occurring in adults, because a malformation or lesion (usually of vascular origin) of the embryonic lens in full activity causes an arrest of development or some alterations in the developing ocular membranes, while in adults or old persons a senile affection or alteration of the ocular membranes, particularly the uveal tract, causes a less active degeneration of the lenticular cells. R. J. COULTER.

VI.—AFFECTIONS OF THE EYE OF OTITIC ORIGIN.

(1) Gruening, E.—**The optic disc in purulent otitic disease and its complications.** *Archives of Ophthalmology*, March, 1913.

(2) Westmacott, F. H.—**Oculo-motor paralysis of otitic origin.** *Lancet*, November 14th, 1914.

(1) **Gruening**, of New York, states that purulent otitic disease may be complicated by either choked disc or optic neuritis, and he thinks that a clear distinction between these two conditions is important, in that it influences diagnosis, prognosis, and therapy. If the condition be one of choked disc, the cause is probably chemotaxis, and a cure of the ear condition may result in a complete return of the disc to normal, both in appearance and in function. In one case with double mastoiditis, and symptoms of thrombosis of the lateral sinus on one or other side, it was decided to operate on the side on which the choked disc was most marked and this proved to be the side of the thrombosis. In optic neuritis from ear disease, on the other hand, the cause is purulent meningitis, which is not amenable to treatment. ROSA FORD.

(2) We would earnestly draw the attention of all readers of THE OPHTHALMOSCOPE to the very excellent article by **Westmacott,** of Manchester, on oculo-motor paralysis of otitic origin.

The author deals not only with such otitic origin, but also gives a synopsis of the regional anatomy of the cranial nerves which enter the orbit, and relates the various symptoms of oculo-motor paralysis to various pathological states in the neighbourhood. In a very few words, comparatively speaking, a great deal of light is thrown upon the differential diagnosis of the origin of the various palsies. The article is not suitable for abstract in this respect. One may be content to transcribe the final paragraph, which deals exclusively with otogenic paralyses.—" To sum up, it appears that otogenic paralysis of the oculo-motor and other orbital nerves is clearly established, but our difficulty arises when we endeavour to establish the pathological lesion present. When paralysis exists with an ipsolateral otorrhœa, accompanied by headache and vomiting, an exploration of the auditory apparatus should be at once undertaken to determine the extent and limits of the disease, whilst at the same time it should be borne in mind that the examination of the nasal fossæ and accessory cavities may reveal the focus of disease, insomuch as nasal disease infection is far more common than aural infection in the production of paralysis of the oculo-orbital nerves."

ERNEST THOMSON.

VII.—THE NASAL ACCESSORY SINUSES.

(1) **Foster, John.—Case of inflammatory œdema of the optic nerve due to acute suppuration of the antrum of Highmore.** *Ophthalmic Review*, November, 1913.

(2) **Berard, Sargnon, et Bessière.—A contribution to the clinical study of total or partial isolated paralysis of the common oculo-motor nerve as a complication of severe otitis and of facial sinusitis. (Contribution à l'étude clinique de la paralysie isolée totale ou partielle du moteur oculaire commun comme complication des otites graves et des sinusites de la face.)** *La Clinique Ophtalmologique*, 10 décembre, 1913.

(3) **Denis, Maurice and Vacher, Louis.—The orbito-ocular complications of the various forms of sinusitis. (Complications orbito-oculaires des sinusites.)** *La Clinique Ophtalmologique*, 10 juillet, 1914.

(1) The subject of this report by **Foster**, of West Hartlepool, is said to have had an attack of influenza, on the fourth day of which he noticed blurring of the sight of the left eye and diplopia. A fortnight latter he was found to have a vertical squint and a sluggish dilated pupil; there was also an irregular swelling in the floor of the orbit, painful to touch. Vision was reduced to 6/60, media were clear, optic disc was blurred, but not appreciably swollen. Much offensive pus was removed from the antrum. A year later the functions of the eye were found to be normal, and there was no trace of old trouble in it.

A. H. PAYAN DAWNAY.

(2) **Berard, Sargnon**, and **Bessière**, of Lyons, have observed, in the course of two years, four cases of isolated paralysis of the third nerve. Two were cases of fatal otitis, and two were cases of acute sinusitis, which became cured. Isolated third nerve paralysis is an extremely rare complication. The authors give their cases in full detail and afterwards review the literature. Their general conclusions are as follows.—(1) Isolated total paralysis of the common oculo-motor nerve constitutes, in cases of chronic otitis, a syndrome which is extremely rare compared with the much greater frequency of isolated paralysis of the sixth nerve (*moteur oculaire externe*), described by Gradenigo. Aside from a compression lesion due to a cerebral abscess, isolated and total paralysis of the common oculo-motor may be due to a lesion of the anterior part of the petrous bone and especially of the outer face of the cavernous sinus. Surgical interference may be attempted, but the prognosis is of the gravest. (2) In the course of frontal, ethmoidal, sphenoidal, and even maxillary sinusitis, isolated, total, or partial paralysis of the common oculo-motor may be observed. Partial paralysis is of good omen, total paralysis presents a much graver prognosis, but may become cured even without intervention.

ERNEST THOMSON

(3) **Denis** and **Vacher**, of Orleans, review the anatomical relations of the various sinuses to the orbit and its contents, and the spontaneous and post-operative complications of sinus disease. The article is hardly suitable for abstraction. S. E.

VIII.—BLEPHAROCHALASIS.

Stieren, Edward.—Blepharochalasis: Report of two cases. *Trans. American Ophthalmological Society*, Vol. XIII, Part iii, 1914, p. 713.

The peculiar condition in which the skin of the upper eyelids undergoes atrophy and forming a bag-like pouch, droops and conceals more or less of the ciliary margin, thereby simulating ptosis, was described by the famous William Mackenzie in 1854. To E. Fuchs, however, who wrote in the year 1896 (*Wiener klin. Wochenschrift*) belongs the credit of having bestowed upon it the name by which it is now generally known, " Blepharochalasis," and of having fully described a series of cases.

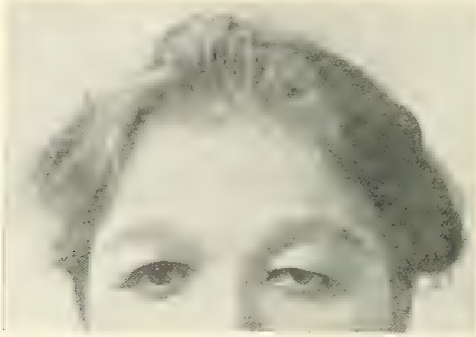

FIG. 1.—Case 1. Before operation.

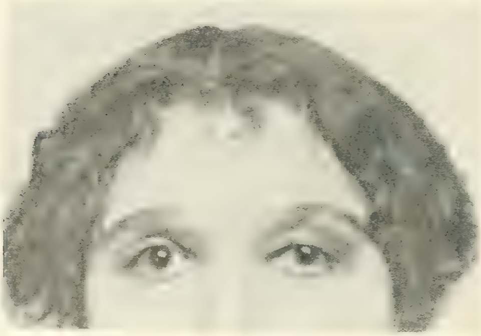

FIG. 2.—Case 1. Four months after operation.

Stieren, of Pittsburg, in the present communication, relates particulars of a couple of cases in females, aged 19 and 14 years respectively. The condition, which was progressive, had commenced at about the same time as menstruation in both patients. In both, the skin of the upper eyelid had the characteristic wrinkled silk paper appearance described by Fuchs (Fig. 3).

FIG. 3.—Upper right lid of Case 2, illustrating the "wrinkled tissue-paper" appearance of the integument.

The elder of the two patients had several isolated masses of adipose tissue developed beneath the skin of the eyelid, and these could be temporarily reduced backward into the orbit by pressure. In the younger patient two such masses could be felt, but only on introducing the tip of the little finger well under the ridge of the orbit above. An excellent æsthetic result (see Figs. 1 and 2) was obtained in the elder patient by excising the redundant skin, together with the nests of adipose tissue mentioned above, and by stitching the cellular tissue to the periosteum of the orbit, completing the operation by suturing the incisions in the integument by a continuous silk suture.

A microscopical examination was made of the tissues removed by operation. The stratum corneum of the skin was markedly thickened in places. There was absence of adipose tissue and of papillæ in the corium. The stratum reticulare (stained with Weigert's elastic tissue stain) was poor in elastic fibres, showing a general atrophy and in many places disappearance of elastic tissue. The subcutaneous cellular tissue suggested a pre-existing state of intense œdema. There was a general hyperplastic condition of the cutaneous vessels, together with a marked increase in their number.

SYDNEY STEPHENSON.

IX.—"SQUIRREL PLAGUE" CONJUNCTIVITIS.

(1) **Wherry, William B., and Lamb, B. H.—Infection of man with Bacterium tularense.** *Journal of Infectious Diseases* (Chicago), Vol. XV, No. 2, September, 1914.

(2) **Vail, Derrick T.—A case of "squirrel plague" conjunctivitis in man.** *Ophthalmic Record*, October, 1914.

(1 and 2) We have been favoured by **Vail**, of Cincinnati, with reprints of these two articles respectively by himself and by **Wherry** and **Lamb**, also of

Cincinnati. They concern what is to us a new disease, and apparently the present case is the first recorded as occurring in man, and the first case of eye disease in man proved to be due to the micro-organism *Bacterium tularense.*

From Vail's article we learn that bubonic plague first appeared as an epidemic in the United States at San Francisco in the year 1900. In 1903 it was at first suspected that the plague which was destroying ground squirrels in great numbers in many parts of the country around San Francisco was really bubonic plague. Then cases of a *plague-like* infection began to appear in man in country districts. In these no reasonable mode of conveyance save through ground squirrels seemed plausible. As time went on and various observations were made, opinion varied as to whether or not squirrel plague and bubonic plague were one and the same thing. Finally (and we have omitted many of the intermediate steps), in 1911, McCoy and Chapin identified the germ of squirrel plague, grew it on egg-yolk culture, proved its identity, described it fully, and named it *Bacillus tularense* (after the county of Tulare, in California) : see *Journal of Infectious Diseases*, 1912. These authors state that the essential pathological lesions of fatal squirrel plague in rodents are many whitish or yellowish caseous granules in the spleen and liver. In a footnote it is stated that squirrel plague may be due either to the *Bacillus pestis* or to the *Bacterium tularense,* but that the latter is the organism of the disease under discussion.

On referring to the article by Wherry and Lamb, one gathers that *Bacterium tularense* is difficult to grow. It can, however, be cultivated on coagulated egg-yolk of a particular consistence. It will not pass through a No. 5 Berkefeld filter. The organism is just as small as, if not smaller than, that of guinea-pig pneumonia, so that its failure to pass the filter may, the writers suggest, be due to the presence of the large amount of capsular substance. *Bacterium tularense* is a minute rod surrounded by a considerable amount of capsular substance when in the tissues of infected animals. In the experience of Wherry and Lamb, the organism is only to be seen in rod shape when the animal is chloroformed before death. *Post-mortem* it soon rounds up into coccoid bodies. No distinct capsule is to be seen in cultures. It is impossible in an abstract to give in further detail the characteristics of the organism. The original work of McCoy and Chapin above mentioned, and the paper under notice by Wherry and Lamb, should be consulted.

Turning again to Vail's article, we come next to the description of his case of squirrel plague infection of the human eye. The patient was a man, aged 28 years, a meat cutter in a restaurant in a slum district. The inference is fair, says Vail, that rabbits affected with caseous buboes came to his table for cutting, that he held the diseased meat in his left hand, cutting with the knife held in his right hand, and that he introduced the poison into his left eye with his left finger. "We have no proof for this, but it would pass for 'Sherlock Holmes' evidence."

The patient consulted Vail on November 24th, 1913, on account of an acute and violent inflammation of the left eye. Family and personal history unimportant. Left eye became inflamed three days ago. Lid margins agglutinated in the morning. "Sore lump" in front of the left ear. Watery discharge from eye ; no pain, vision unaffected. It was found, on examination, that the right eye was normal. In the left eye the redness and swelling of the eyelids, the intense chemosis, and the muco-watery secretion suggested gonorrhœal ophthalmia. The preauricular gland was the size of a cherry, and tender to touch. The cornea was clear, the tension normal, the iris normal, the pupil normal, the dioptric media were clear, the vision was normal, and the ophthalmoscopic examination negative. "On everting the eyelids the seat of disease is revealed. The conjunctiva is riddled with about ten discrete deep, round, yellow necrotic ulcers, that run clear through the *substantia propria* of the conjunctiva quite to the tarsus. There are six such round ulcers over the upper tarsus, and four at least over the lower tarsus. The ulcers appear punched out, but filled with golden-yellow necrotic plugs. Sizes vary from 6·0 mm., the largest, which exists near the upper edge of the tarsus of the upper lid, to about 1·0 mm. The surrounding conjunctiva is deep-red, very soggy and swollen, but does not bleed on being wiped with a wet cotton sponge. The necrotic plugs in the beds of the ulcers cannot be wiped away. The contrast between the deep-red colour of the conjunctiva and the brilliant golden colour of the ulcers is as striking as a turkey-red calico dress with yellow 'polka dots.'"

No gonococcus was found, and the tentative diagnosis of Parinaud's conjunctivitis was made. Next day this diagnosis was abandoned on account of the ulcers. The condition was considered as too acute for tuberculosis, and chancre was ruled out. (It should be said that Wherry and Lamb's bacteriological investigation of the case commenced contemporaneously with the first note by Vail on November 24th, or at any rate their first note is of that date.)

The patient lost weight, had a rise of temperature, looked cachectic and ill, had the glands of the corresponding side of face and neck enlarged, and developed a pustular eruption on the face. On 28th November, while the appearance of the left eye had not improved, the cornea remained brilliant and the vision unaffected. The left nostril discharged a watery mucus freely, and the left turbinals were swollen and red. The diagnosis was changed to "glanders or farcy," and the patient advised to go to the Cincinnati Hospital. This the patient did not do at the time, but on December 1st it was found that there was an abscess of the lacrymal sac. He was then persuaded to go to hospital. At this point the conditions as found at hospital are detailed, but we shall omit them here. On December 9th the abscess of the tear sac was incised. The patient was discharged from hospital on December 11th. Drainage from the abscess had then ceased. The conjunctival ulcers had disappeared, but the preauricular and other glands remained enlarged. The temperature chart showed the typical rise and fall of a general septic infection. The patient was never seen again. The man wrote that he was well and back at work.

In concluding this very imperfect abstract, the reviewer may say that Vail's article on the history of the squirrel plague and the clinical symptoms of this case in which the infection was transmitted to man, as well as Wherry and Lamb's proof that the organism concerned was the *Bacillus tularense*, must be read in the originals in order to be properly appreciated.

(Vail's article has a black and white sketch or diagram which shows the situation and size of the conjunctival ulcers in the man. Wherry and Lamb's article has a coloured plate showing the naked eye appearances in the conjunctiva, liver, and spleen of a rabbit, and micro-photographs of a culture of *Bacillus tularense* on coagulated egg-yolk, × 1000.)

ERNEST THOMSON.

X.—HEREDITARY OPTIC NEURITIS AND ATROPHY.

(1) **Mügge, F.—A contribution to Leber's family optic atrophy. (Beitrag zur Leberschen familiären Optikusatrophie.)** *Zeitschrift für Augenheilkunde*, März, 1911.

(2) **Bruner, W. E.—Hereditary optic atrophy with X-ray findings.** *Archives of Ophthalmology*, September, 1912.

(3) **Worton, A. S.—Hereditary optic neuritis.** *Lancet*, October 18th, 1913.

(4) **Takashima, S.—Six cases of Behr's complicated hereditary family optic atrophy of childhood. [Sechs Fälle der komplizierten hereditärfamiliären Optikusatrophie des Kindesalters (Behr).]** *Klin. Monatsbl. f. Augenheilkunde*, Dezember, 1913

(1) **Mügge**, of Giessen, gives a careful account of cases of this disease occurring in two families. In one of them, in addition to the usual central scotoma, a ring scotoma was made out. The literature of the subject is carefully reviewed, and the whole subject critically discussed. The fields of vision are given. The symptoms noted were those described by Leber in his classic monograph upon the disease. A retrobulbar neuritis causes at first a rapid and then a gradual loss of vision, which next becomes stationary for some time, and eventually may improve slightly. The loss of acuity is due to the formation of a central scotoma. This may be absolute or apply only to red and green. Ophthalmoscopically, temporal pallor is a very well marked appearance, and there may be some loss of edge and slight hyperæmia. Later in the disease there may be general pallor of the disc, with some narrowing of the arteries. Leber's disease is much more common in the male members of an affected family than in the females, but is passed on through sound females. T. HARRISON BUTLER.

(2) The point of chief interest in this case by **Bruner**, of Cleveland, was a marked enlargement of the sphenoid cells and thinness of their walls, which were discovered by X-ray photographs. The sella Turcica also showed a projection upwards of its floor. The patient was a man of 36 years, and his only brother, one of his six sisters, a nephew (son of one of his sisters), and two maternal uncles had had trouble with their eyes. The sister was examined by Bruner, who found optic atrophy with a central scotoma in each eye, and an X-ray examination showed much enlarged sphenoidal cells. The mother and an unaffected sister were also examined with X-rays, and in these the sphenoidal cells appeared much smaller than in those members affected by the disease. Other plates made from normal individuals all showed much smaller cells, with the possible exception of one. On first examination, the fields showed a central absolute scotoma in each eye, with slight concentric contraction of the form fields and complete inability to recognise red and green. Both the scotoma and the concentric contraction have steadily increased in spite of all treatment, the only improvement noticed taking place after a subtemporal decompression, which allowed the escape of a great excess of free subdural fluid; during the few days before the operation, vision became much worse and for two days after the operation, the patient was entirely blind. After this, vision improved for several days and then became stationary. No abnormality of his general condition could be

discovered after an exhaustive examination. Treatment with mercury, potassium iodide, pituitary body, thyroid extract, and by opening the sphenoidal cells was without effect. Bruner hopes the account of this patient will induce others to examine these cases with X-rays. Possibly his case, he thinks, is not one of pure Leber's disease, but of one of the allied varieties.

ROSA FORD.

(3) **Worton**, of London, reviews the principal points in connection with this disease, known as hereditary optic atrophy or Leber's disease; and sets out the family chart of his own eleven cases. Of these only four were examined personally, the history of the remainder being very imperfect. The fields are charted in one case, and show a central scotoma surrounded by a partially scotomatous area. The peripheral fields are normal. All the affected individuals were males. The ages varied from nine to thirty-two years. Of the four cases personally examined, two had regained practically normal vision, but with some deficiency in the light-sense; one case is still under observation; and in one the vision, eight years after the commencement of the trouble, is reduced to hand-movements close to the eyes. Of the remaining six living cases nothing is known of the present visual condition of two, one is stated to be blind, and the sight of one is bad. Improvement has occurred in two cases. In all the cases where improvement or recovery had taken place, the age-incidence of the disease was below twenty years.

With regard to treatment, the author says it is doubtful whether the course is modified by drugs or by any other form of treatment. Dark glasses in the neuritic stage and measures directed to the maintenance of the general health will be required. Injurious indulgencies, such as sexual excess, alcohol, and tobacco should be avoided, and small daily doses of strychnine may be given. ERNEST THOMSON.

(4) In 1909 Behr described a symptom-complex under this title, the features of the cases being a bilateral optic atrophy, chiefly temporal, or bilateral optic neuritis, central scotoma, visual defect, equally severe in both eyes, slight spasm and exaggeration of reflexes in the lower limbs without paresis, slight ataxy, staggering gait, debility, and mental defect.

Takashima, of Kiel, records six cases which apparently belong to the same group. All the patients were young—six to seventeen years of age, and showed imperfect physical and mental development. All had suffered from their earliest life from defective vision, and this had not increased but remained stationary. They all presented atrophy of the temporal segment of both discs, without other fundus change. The pupils were practically always normal. All had nystagmus. There was paracentral scotoma in two cases. The general bodily state and nervous symptoms were the same as in Behr's cases. Takashima's cases differed from Behr's in being older (the ages of Behr's were from three to eleven), and in the presence of paracentral scotoma in two cases. It is proved by their histories and the results of long observation that the symptoms begin in fœtal life, or within the first year, and show no tendency to advance as time goes on. A. J. BALLANTYNE.

XI.—ORBITAL CELLULITIS.

(1) **Dutrow, Howard V.—A case of retrobulbar pneumococcic abscess of the right orbit.** *Archives of Ophthalmology*, March, 1911.

(2) **Muncaster, S. B.**—Orbital cellulitis caused by staphylococci. *Ophthalmic Record*, August, 1913.

(3) **Sebileau, Pierre.**—Suppurative periodontitis and phlegmon of the orbit. (Périodontite suppurée et phlegmon de l'orbite.) *Ann. d'Oculistique*, avril, 1914.

(4) **Clegg, J. Gray.**—A case of orbital cellulitis produced by ethmoidal sinusitis. Purulent meningitis. Death. *Medical Chronicle*, April, 1914.

(5) **Pascheff.**—Transitory myopia during orbital cellulitis. (La myopie transitoire dans la cellulite orbitaire.) *Ann. d'Oculistique*, juin, 1914.

(6) **Pascheff.**—Detachment and white spots in the retina in a case of streptococcic orbital phlegmon. (Décollement et plaques blanches de la rétine dans un phlegmon orbitaire streptococcique.) *Ann. d'Oculistique*, juin, 1914.

(1) The patient, a boy of 14 years, in a state of malnutrition, had had an attack of lobar pneumonia six months before. **Dutrow** thinks that in the lowered state of resistance of the patient, his pneumonia had remained more or less unresolved, and that metastasis occurred from the lungs through the general circulation. Recovery took place after the abscess had been opened and drained, and vision returned from 20/70 to 20/40, which could have been brought up to normal by the correction of a low grade of hyperopia.

ROSA FORD.

(2) **Muncaster**, of Washington, describes the case of a boy who developed staphylococcal frontal abscess and right orbital cellulitis secondarily to infected facial pimples. There was considerable systemic disturbance, and although much pus was evacuated through incisions into the forehead and orbit, the cellulitis persisted for over a fortnight and set up a perforated ulcer of the cornea and symptoms of septicæmia. Repeated incisions were made into recurrent orbital abscesses, and general tonic treatment was combined with the administration of staphylococcus vaccine. In two months a cure resulted, with vision of 20/15. J. JAMESON EVANS.

(3) **Sebileau**, of Paris, records three cases of acute necrosing osteitis of the face in which the inflammatory phenomena started from an acutely suppurating dental alveolus and spread by continuity to the greater part of the superior maxilla, the ethmoid, and the orbit. In one case the orbital involvement was limited to incomplete external ophthalmoplegia, but in the other two it spread to the depths of the cavity, causing suppuration and incurable optic atrophy, in addition to temporary disturbances in the motor apparatus of the eye. R. J. COULTER.

(4) The main facts of this case, reported by **Clegg**, of Manchester, may be resumed as under :

A girl, aged 19 years, had always experienced difficulty in nasal respiration. A couple of days after the onset of headache and vomiting, swelling of the right upper eyelid and chemosis made their appearance. Eyeball fixed, and sight blurred. A week after the beginning of the illness, a quantity of evil-smelling pus was evacuated from the orbit, with relief to the symptoms. Three days after the operation, however, a brawny swelling on the right side of the forehead made its appearance. The temperature ran up to 103° F. A small quantity of fœtid pus was liberated from beneath the periosteum on the right half of the frontal bone. Symptoms of meningitis developed on the same night, and death occurred on the following day.

At the autopsy, purulent meningitis and pus in ethmoidal sinuses. Streptococci. Clegg surmises that the condition started in the posterior nares and involved the ethmoidal sinus. Thence it spread by way of the diploë to the orbit and subcutaneous tissues on the right side, and to the base of the brain and the membranes covering the cerebral hemisphere on the left.

Sydney Stephenson.

(5) **Pascheff**, of Sofia, records the case of a man, aged twenty-six years, who developed right orbital cellulitis accompanied by 3.5D. of myopia and an ocular tension of 35mm. Hg., with a dilated and sluggish pupil. A careful general examination showed that he had exudative pleurisy on the right side, with hypertrophy of the spleen, but no other disease. Under treatment with diaphoretics and hot compresses, the cellulitis underwent resolution, the ocular tension fell to normal, and the refraction became emmetropic. The author considers that the cellulitis must have been secondary to the pleurisy and that the myopia and slight mydriasis were due to the high ocular tension, as they disappeared when it fell to normal. Finally, he is of opinion that there is a relation between the ocular and orbital tensions which might be investigated with advantage.

R. J. Coulter.

(6) **Pascheff**, of Sofia, records a case of orbital abscess due to streptococcal infection, in which, in addition to the usual symptoms, the ocular tension was raised to 50 mm. Hg., the retina was detached, and there were numerous dull whitish spots, some superficial, and others deep, occurring separately and in groups in the macular region. After evacuation of the abscess, the tension became normal, and four months later, the detachment had disappeared, but there were still numerous shiny whitish spots in the macular region, and the vision was reduced to counting fingers with the nasal part of the retina, owing to optic atrophy.

The author considers that orbital suppuration should be added to the list of conditions which are recognised as causing white spots in the retina and that detachment of the retina may occur as a complication of phlegmon of the orbit when it is due to subretinal exudation, caused by toxines from the orbital suppurative focus acting on the choroidal blood vessels.

R. J. Coulter.

XII.—“PARA-SYMPATHETIC” OPHTHALMIA.

Morax.—Atypical keratitis. Exogenous corneal infection with gummata of the iris and cyclitis of the second eye (para-sympathetic ophthalmia). [Kératite atypique. Infection cornéenne exogène avec gommes de l'iris, puis cyclite du second œil (ophtalmie para-sympathique).] *Ann. d'Oculistique*, octobre, 1912.

Morax, of Paris, records, under the name of “atypical keratitis,” a case of a curious infective corneal lesion which could not be identified with any recognised ocular affection. Although the patient was under observation for eight months, the author was unable by clinical or laboratory methods to determine the ætiology of the singular infection, which, however, presented great analogies with certain forms of experimental corneal mycosis.

The patient, an agricultural labourer, aged 18, had a superficial injury to his right cornea with a piece of straw, which remained in the eye for a week. This was followed by a persistent irritability associated with (1) a small corneal ulcer, (2) the development of iridic nodules resembling syphilitic or tuberculous gummata. The case ran a slow course in spite of varied treatment—atropine, iodoform, cauterisation, paracentesis (three times), iridectomy, potassium iodide in large doses, and salvarsan (three intravenous injections cf 30 centigrammes). Eventually, the inflammation subsided, leaving leucomata, an occluded pupil, and atrophic patches on the iris. An optical iridectomy was performed with satisfactory result. Bacteriological examination of (1) scrapings from the ulcer, (2) aqueous humour both pure and after puncturing one of the gummata with the point of a keratome, and (3) the piece of iris excised gave negative results both in smears and cultures on a varied selection of media. Inoculations of a guinea pig with the excised piece of iris tissue also gave a negative result. The Wassermann reaction was negative, and a subcutaneous injection of a tenth of a milligramme of tuberculin (Institut Pasteur) did not cause any definite reaction.

Three months after the commencement of the inflammation in the right eye, and before the lesions in it were cauterised, the left eye developed definite cyclitis with large precipitates on the posterior surface of the cornea, and moderate inflammatory reaction but no diminished tension or involvement of the deep tissues or vitreous. After several relapses, the cyclitic lesions became milder, but when the patient left the hospital, he still had numerous precipitates on his cornea.

Discussing the possible cause of the peculiar inflammation in his patient's right eye, the author points out that the lesions in it are very similar to those produced by Fava in the eyes of rabbits by the injection of cultures of *Sporotrichum Beurmanni*, but owing to his failure to cultivate the organism, and the inefficiency of large doses of potassium iodide, he rejects the diagnosis of sporotrichosis. The negative results of the tuberculin injection, and the inoculation of a piece of iris tissue in a guinea pig, are against a tuberculous origin, while the negative Wassermann and the absence of improvement after injections of salvarsan, exclude syphilis. The author therefore concludes that it was due to one of the numerous infections of the nature of which we are still ignorant. He is of opinion that the cyclitis in the left eye was probably due to a special form of sympathetic inflammation, to which the name of "para-sympathetic ophthalmia" should be given temporarily.

R. J. COULTER.

XIII.—ECTROPION OF THE UVEA.

(1) **Dunn, John.—An unusual case of ectropion of the uvea and extensive defect of the iris.** *Archives of Ophthalmology*, July, 1911.

(2) **Knapp, Arnold. — Phantom intra-ocular tumour.** *Archives of Ophthalmology*, November, 1911.

(3) **Samuels, B.—Upon congenital ectopia of the uvea. (Ueber Ectopium uveæ congenitum.)** *Zeitschrift für Augenheilkunde*, April-Mai, 1914.

(1) **Dunn** reports a case in a man of 30 years in which no reflex could be obtained until the pupil was dilated with atropine, on account of the protrusion through the pupil of large masses of brownish-black

pigment, which, although attached at one end, moved here and there in the aqueous with the movements of the eyes. There were spots of pigment deeply situated in the cornea, and in one of the spots, the pigment was continuous with one of the pigmented fringes protruding from the pupillary margin, "showing unmistakably the source of all the pigmented spots beneath Descemet's membrane." The dilated pupil showed large deficiencies in the sphincter of the iris, not at all like a coloboma of the iris. The fundus was normal, and the vision in each eye 16/30, not improved by glasses. The author compares his case with that of Okuse, who found that the sphincter pupillæ was abnormally developed. ROSA FORD.

(2) **Knapp**, of New York City, reports a case similar to those previously described by Haab and Pagenstecher. The patient, a woman, was 73 years of age. Symptoms had been present six months, and consisted of first redness and later protrusion. V. = 20/70. Disc normal. There was a shallow detachment below in the periphery of the fundus. On dilating the pupil a round brownish swelling was seen back of the iris on the temporal side. Tension normal. The eye was enucleated and no tumour was found in the orbit, but an aneurism of the ophthalmic artery. There was no tumour in the eyeball, but microscopically, a cystic condition of the pars ciliaris retinæ. The tumour seen clinically was probably a large cyst, which ruptured on opening the eyeball. ROSA FORD.

(3) **Samuels,** of New York, working in Elschnig's Clinic at Prague, describes carefully the clinical features and microscopical anatomy of a case of congenital ectopia of the uvea. The subject died of tuberculosis. The communication is of interest to pathologists. T. HARRISON BUTLER.

XIV.—THE HEALING OF EXPERIMENTAL TREPHINE WOUNDS.

Ellett, E. C.—A study of the healing of trephine wounds of the sclera and corneo-scleral junction. *Transactions of the Section on Ophthalmology of the American Medical Association*, 1914, pp. 390-394.

The exact way in which a wound made with the trephine in the corneo-sclera heals is a matter not only of scientific interest but of practical importance also. It has been thought by some that the surgical aperture remains permanently patent. Others speak of a "filtering cicatrix," thereby assuming that the wound becomes filled in with a loose tissue, permitting percolation of the aqueous humour. Colonel Elliot himself has recently expressed his belief "in the production of a fistula, not of a filtering cicatrix" (Seventeenth International Medical Congress).

Attempts have been made to settle the question by the histological examination of trephined eyes, both of human beings and of certain of the lower animals. **Ellett**, of Memphis, Tenn., quotes the work in this direction accomplished by Kuemmel (*Bericht der Ophthalmologischen Gesellschaft zu Heidelberg*, 1913, p. 205) Rochon-Duvigneaud and Ducamp (*Bull. de la Société d'Ophtal. de Paris*, juin, 1913), Aurand (*La Clin. Ophtalmologique*, X. IX. XII.), Holth (*Norsk. Mag. f. Laegevidensk*, LXXIV., 1912 and *Bericht der Ophthalmologischen Gesellschaft zu Heidelberg*, 1913, p. 355), and the present reviewer (THE OPHTHALMOSCOPE, November, 1913).

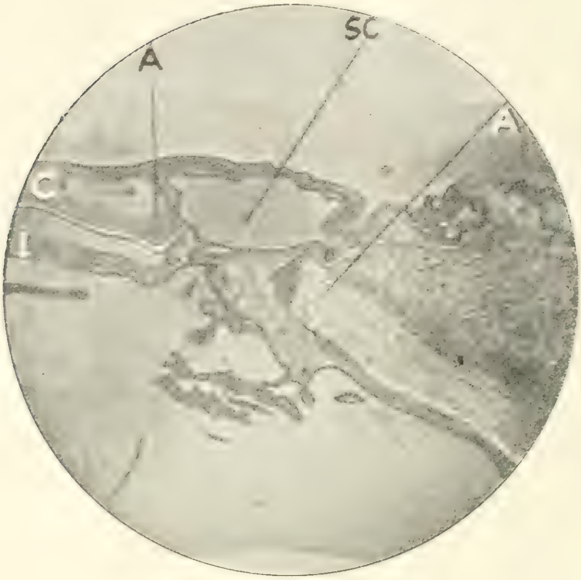

Fig. 1.—Section of rabbit's eye three weeks after corneo-scleral trephining with 1·5 mm. trephine; × 50. S. C., subconjunctival cyst.

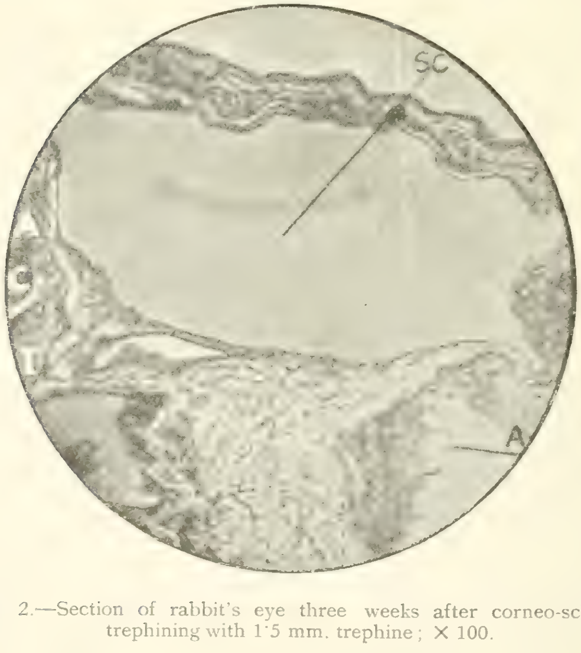

Fig. 2.—Section of rabbit's eye three weeks after corneo-scleral trephining with 1·5 mm. trephine; × 100.

Ellett then describes his own experimental attempts to solve the question, which were commenced in the autumn of 1913, in ignorance of the work of other observers. Under general anæsthesia, the operation of sclero-corneal trephining was performed upon a series of rabbits. The diameter of the trephine employed was either 1·5 mm. or 2 mm., and in most cases a

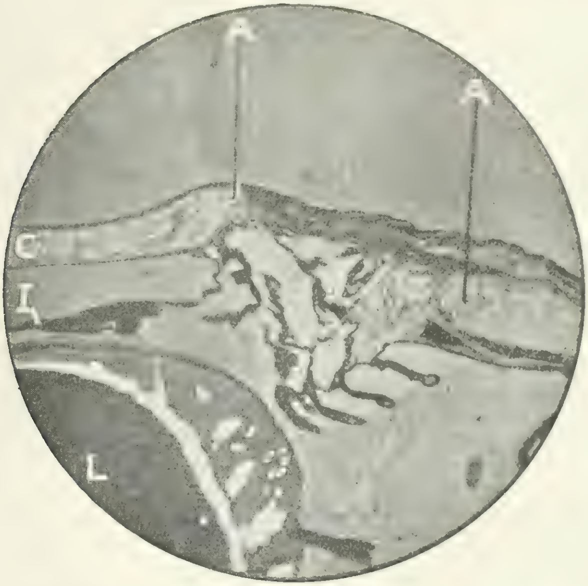

Fig. 3.—Section of rabbit's eye eight weeks after corneo-scleral trephining with 2 mm. trephine; × 50

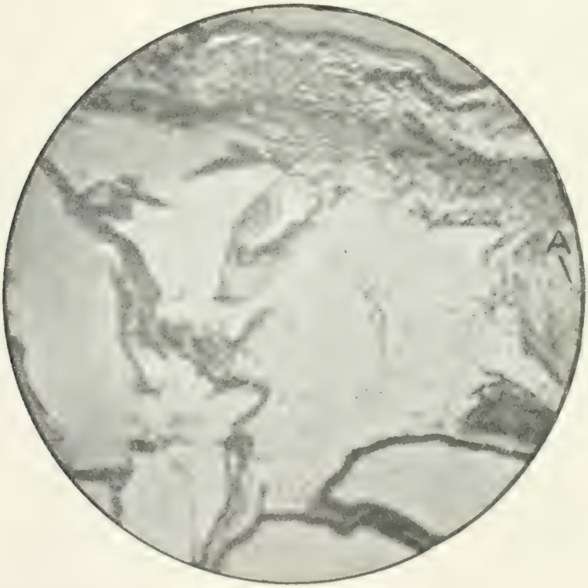

Fig. 4.—Section of rabbit's eye eight weeks after corneo-scleral trephining with 2 mm. trephine; × 100.

peripheral iridectomy was performed. Elliot's *technique* was followed "as nearly as possible." Twelve eyes were thus operated on, and subsequently enucleated at the end of the first, second, third, fourth, fifth, sixth, seventh, and eighth week respectively. The specimens were placed in 3 per cent.

formaldehyde for forty-eight hours, frozen, and cut, immersed in 70 per cent. alcohol, and then prepared in the usual way for embedding in celloidin.

Ellett's communication is accompanied by twenty illustrations, showing the various eyes under low and high magnification. In one eye alone, that enucleated at the end of the third week, was there any condition that suggested a fistula or filtration, and in that eye, as shown by the figures (Figs. 1 and 2), this took the form of a subconjunctival cyst. In Figures 3 and 4, which represent an eye enucleated at the end of the eighth week, there was no attempt at regeneration of the sclera, the trephine aperture being bridged over by a prolongation of the subconjunctival connective tissue. In all other eyes the defect was seen to close gradually with the production of tissue practically identical with the surrounding sclera. In time this became indistinguishable from the adjoining cornea and sclera. So far as the appearance of the new tissue was concerned, it was not more permeable than the rest of the corneo-sclera.

In reference to Ellett's experimental work on rabbits, the reviewer would venture to point out that it is practically impossible to carry out Elliot's *technique* on these animals, inasmuch as the conjunctiva is too thin, the cornea cannot be "split," and, lastly, there is so great a tendency to prolapse of the iris that it can be avoided only with the greatest difficulty. In cats, too, the conditions differ a good deal from those found in the human eye. There seems reason for believing that a similar remark is true of dogs also. These points render it extremely doubtful whether the results obtained in rabbits, cats, and possibly dogs can be applied to the case of man, in whom an obvious hole in the sclera can often be recognised clinically months after the performance of Elliot's operation of sclero-corneal trephining. The observations, however, are clearly of great interest. SYDNEY STEPHENSON.

XV.—REMEDIES.

(*First Notice.*)

(1) Lint, van.—The pre-operative treatment of a tuberculous dacryocystitis with bismuth paste. (Traitement préopératoire, à la pâte de bismuth, d'une dacryocystite tuberculeuse.) *La Policlinique*, 1 février, 1912.

(2) Weekers.—Aetiology of ophthalmia neonatorum: practical indications for its treatment. (Etiologie de l'ophtalmie des nouveaux-nés: indications pratiques pour son traitement.) *Le Scalpel*, 24 mars, 1912.

(3) Dewaele.—Upon the treatment of tobacco amblyopia by lecithin. (Sur la médication de l'amblyopie nicotinique par la lécithine.) *Académie Royale de Méd. de Belgique*, 27 avril, 1912.

(4) Dewaele.—Utilisation of the disinfectant properties of iodine in eye work. (Utilisation des propriétés disinfectantes de l'iode en oculistique.) *Société Belge d'Ophtalmologie*, 28 avril, 1912.

(5) Piccillo, L.—The treatment of granulous conjunctivitis and of spring catarrh by heterogenous serum. (La prosunta cura della congiuntivite granulosa e del catarro primaverile col siero eterogeneo.) *Annali di Ottalmologia*, Vol. XLI, fasc. i-ii., p. 3 to 16.

(6) Feruglio, A.—A case of epithelioma of the eyelids cured by the active principle of Jequirity. (Caso di epitelioma palpebrale guarito col principio attivo del Jequirity.) *Annali di Ottalmologia*, Vol. XLI, fasc. i-ii.

(7) Spoto, S.—Coloured protective glasses : a contribution to the study of the chemical reactions of the retina and of its histological and functional changes under the influence of different kinds of coloured glass. (Lenti di protezione colorate : Contributo alla reazione chimica de della retina ed ai suci incitamenti istologici e funzionali sotto l'influenza dei varii occhiali coloratio.) *Annali di Ottalmologia*, Vol. XLI, fasc. iii., p. 165 to 205.

(8) Bori, L.—'606' in affections of the eye. (Il '606' nelle affezioni oculari.) *Annali di Ottalmologia*, Vol. XLI, fasc. iii., p. 130 to 143.

(9) Colombo, J. L.—Salvarsan in ophthalmology : review and statistics according to the literature up to the end of December, 1911. (Il Salvarsan in oculistica : rivista e statistica della litteratura fino al Dicembre, 1911.) *Annali di Ottalmologia*, Vol. XLI, fasc. iii., p 207.

(10) Bar and Lequeux.—First results obtained at the Tarnier Clinique with the atoxic antigonococcic vaccin of Ch. Nicolle and L. Blaizot. (Premiers résultats obtenus à la Clinique Tarnier avec le vaccin antigonococcique atoxique de MM. Ch. Nicolle et L. Blaizot.) *Bull. de la Société d'Obstét. et de Gynéc. de Paris*, décembre, 1913.

(11) Bar and Lequeux.—New results observed at the Tarnier Clinique by the employment of the antigonococcic vaccin of Ch. Nicolle. (Nouveaux résultats observés à la Clinique Tarnier après l'emploi du vaccin antigonococcique de M. Ch. Nicolle.) *Ibidem*, janvier, 1914.

(12) Morax, V.—The treatment of gonococcal ophthalmia neonatorum. (A propos du traitement de l'ophtalmie gonococcique du nouveau-né.) *Ibidem*, février, 1914.

(1) **van Lint**, of Brussels, injected into the lower canaliculus Beck's bismuth paste in a young girl affected with tuberculous dacryocystitis, accompanied by a fistula of the skin. The parts were healed in a fortnight. MARCEL DANIS.

(2) **Weekers,** of Liége, admits that there are two varieties of conjunctivitis in the newly-born : the first is due to the gonococcus ; the second, in which trachoma corpuscles are found, is merely a variety of the last-named malady. The preventive treatment should consist in minute disinfection of the female genital organs before labour and in the adoption of Credé's method. The curative treatment consists in abundant washings with potassium permanganate, and in the frequent instillation of protargol or argyrol. The author rarely employs silver nitrate, and then only in cases untouched by the other two remedies. MARCEL DANIS.

(3) **Dewaele**, of Ghent, recites five cases of tobacco amblyopia from which he concludes that treatment with lecithin quickly restores the normal in recent cases of disease, and that even inveterate cases themselves are quickly improved, although generally progress becomes arrested at a certain stage, because there are definitive lesions that cannot be surmounted.

MARCEL DANIS.

(4) **Dewaele**, of Ghent, has employed for three years iodine in ointment form, associated with an anæsthetic, as a disinfectant of the cornea, particularly after the removal of foreign bodies. One of the formulæ employed by him follows :—stovaine, 15 c.gr., to be finely pulverised and

dissolved in five drops of the officinal oil. To be added after having been first mixed in a water bath : lanoline, 5 grammes, and vaseline, 10 grammes. Add gradually the following solution : iodine, 15 c.gr., sodium iodide, 30 c.gr., and water, 1 gr. 50. MARCEL DANIS.

(5) **Piccillo,** of Palermo, interested by the publications of Gallenga and especially of Pes, had tried the treatment of trachoma and of spring catarrh by the subconjunctival injection of the heterogenous serum of the horse or donkey (a specific serum prepared by Professor Bandi). In four cases of trachoma and in three of spring catarrh, of which the facts are related in detail, the injections (repeated five times in the first-named disease and ten times in the second) gave a negative result ; once the local reaction, as shown by pain, œdema of the eyelids and face, and sometimes fever, terminated, the condition of the conjunctiva reverted to its former state.

A. ANTONELLI.

(6) Rampoldi's method (discs of jequiritine applied to ulcerated surface of the neoplasm or to the surface refreshed by partial intervention) has given **Feruglio,** of Milan, an excellent result in a man, of 74 years, affected with cylindrical celled epithelioma of the edge of the lower eyelid. Cicatrisation was perfect, almost without visible trace. A. ANTONELLI.

(7) A good *résumé* of the question, then the report of personal experiences on the retinæ of frogs (to be read in the original) leads **Spoto,** of Palermo, to conclude that smoked glasses and yellow glasses have a protective action of the first order, that Fieuzal or *Schwerflint* glasses also possess an appreciable protective power, while blue glasses, lastly, scarcely diminish at all the migration of pigment and the retraction of the cones. From a clinical point of view, summing up the advantages and the disadvantages, Fieuzal glasses are preferable to yellow glasses, since the last-named are ugly, and sometimes disagreeable. Smoked glasses are inferior from the spectroscopic and photometrical standpoint, while blue glasses afford insufficient protection against the violet rays, especially in cases of veritable retinal hyperæsthesia. *Schwerflint*, so lauded by Vogt, is decidedly too heavy, inferior to Fieuzal, which arrests adequately the violet end of the spectrum, while at the same time not interfering with the luminosity of the surroundings. As to esculine glasses, experiments upon the retinæ of batrachians have demonstrated to Spoto that they act like simple glasses, much inferior to Fieuzal medium tint (No. 4), and spectral and photometric observations have confirmed their negative action upon the retinal functions. A. ANTONELLI.

(8) **Bori,** of Pavia, reports eight cases, mostly instances of interstitial keratitis and iritis, treated by the intramuscular injection of '606.' In one case of typical keratitis (Hutchinson's teeth but Wassermann negative) the result amounted to nothing. In one case of miliary gumma of the iris, with iritis and parenchymatous keratitis (acquired syphilis), and in another of simple interstitial keratitis due to hereditary syphilis the results were excellent after a single injection. The results were satisfactory in a patient affected with interstitial keratitis and deafness (hereditary syphilis : two injections) and in a child of ten years (syphilis acquired at the age of three years) with interstitial keratitis with recurrences (three injections). The results were mediocre in three other cases of interstitial keratitis due to hereditary syphilis. Some of these patients had been subjected in vain to mercurial treatment. The clearing of the cornea, it may be noted, almost always commenced in the infero-nasal sector.

Note by the reviewer.—Bori cites my name among those of surgeons who "believe '606' harmless as regards the eye." But in a first communication with Lévy-Bing and Courtois-Suffit, I described, soon after the introduction of '606,' a case of iritis and of optic neuritis supervening a fortnight after the injection, in a patient suffering from secondary syphilis. In a second communication made in 1912 to the French Society of Ophthalmology, I insisted upon the danger of arsenobenzol in reference to a case where polyneuritis after a couple of intra-venous injections of '606,' had involved six cranial nerves, as well as the spinal. I do not know whether these neurotrophic or meningotrophic accidents are liable to be produced in non-syphilitic subjects, and it is well to recollect that they do not answer to what we know to-day in respect of arsenical intoxication in animals and in man. But it cannot be disputed that the organotropism in question is much more common in syphilis since the employment of '606,' and that the new medicament is not without danger either to life or to the integrity of the visual organ. Up to the present there are no properly authenticated cases of toxic optic neuritis followed by atrophy imputable to '606,' such as have been put to the account of other arsenical preparations, notably atoxyl. Grignolo alone has found in the normal rabbit retinal lesions consecutive to injections of arseno-benzol, and believes that the last-named is capable of provoking by itself ocular mischief. But papillitis, acoustic or labyrinthine neuritis, neuritis of the facial nerve, of the oculo-motor nerves, etc., due to the neurotropism of arseno-benzol, may entail grave and irreparable infirmities, facts that must not be lost sight of when we decide to employ the new agent. The innocuity of the latter is not tenable, any more than its definitive sterilising action: it should not therefore be substituted systematically for the classic treatment. In fact, it should be reserved for exceptional cases, which have resisted mercury, or which call for the rapid cicatrisation of manifestations, especially of the skin. A. ANTONELLI.

(9) **Colombo**, of Parma, has the merit of completing Stuelp's statistics, which already include 470 cases, by adding to them cases subsequently observed, and thus arriving at a total of 812. It goes almost without saying that the exactitude of these figures can be but relative, the literature of arseno-benzol being colossal and scattered through every country in the world. Moreover, classification is difficult, and sometimes arbitrary, as, for example, to class as good or bad results cases that are insufficiently followed or badly related or debatable cases. Be that as it may, here are the figures given by Colombo (for brevity's sake, the names of the authors are suppressed);

1. *Syphilitic affections of the lacrymal sac.*	
Favourable results ...	2
2. *Affections of the eyelids.*	
(*a*) 5 cases of gummata—	
Cure or rapid improvement	5
(*b*) 2 cases of syphilitic tarsitis—	
(*c*) 2 cases of rupia—	
Favourable results ...	4
3. *Conjunctiva.*	
(*a*) 4 cases of primary lesion—	
Cure ...	3
No result	1
(*b*) 3 cases of syphilitic pemphigus—	
Improvement	1
No result	2

(*c*) 1 case of blepharo-conjunctivitis—	
Good result	1
(*d*) 1 case of tertiary ulceration—	
Good result	1
4. *Cornea.*	
(*a*) Two cases of syphilitic keratitis with iritis—	
Amelioration	1
No result	1
(*b*) 201 cases of parenchymatous keratitis (mostly from congenital syphilis)—	
Cure or rapid improvement	53
No result, keratitis of the other eye, slow or doubtful amelioration, relapse after brief delay	148
5. *Sclerotic.*	
11 cases of scleritis, gummata, irido-scleritis, episcleritis—	
Cure or rapid improvement	9
No result or relapse	2
6. *Uveal tract.*	
195 cases of iritis, irido-cyclitis, irido-choroiditis, chorio-retinitis—	
Rapid cure or very favourable evolution	121
Negative results or rapid relapses, very slow or transitory improvements	74
Among these cases, 75 were diagnosed: Affections of the uveal tract, especially anterior (iritis, irido-cyclitis)—	
Favourable results	61
No result	14
25 diagnosed as affections especially of the choroid—	
Favourable results	10
No result	15
7. *Retina and Optic Nerve.*	
(*a*) 1 case of gumma of the retina—cure	1
(*b*) 112 cases of optic neuritis and neuro-retinitis—	
Rapid cure or rapid and considerable amelioration	85
No result	34
(*c*) 52 cases of optic atrophy—	
Some results	19
No result	33
8. *Oculo-motor apparatus.*	
Stuelp in his figures noted 146 cases of pupillary inequality and rigidity or of extrinsic or intrinsic muscular paralysis in cerebral syphilis, tabes, or general paralysis, pseudo-tabes or pseudo-paralysis, with—	
Cure or rapid improvement	42
No result or relapse	104
54 cases of oculo-motor paralysis (almost exclusively extrinsic) must be added, with—	
Favourable result	26
No result	28

9. *Orbit.*

7 cases of exophthalmos, gummata, orbital periostitis, neuralgia of the trigeminus—

Result favourable 7

10. *Sympathetic ophthalmia (non-syphilitic)*—

Result favourable (Fleischer, Siegrist) 3

No result (Flemming) 1

With reference to the foregoing figures, Colombo offers some judicious remarks.—Primary lesions of the ocular appendages, as well as cutaneous manifestations of the eyelids, are readily influenced by arseno-benzol. Parenchymatous keratitis due to acquired syphilis is sometimes benefited, but the classic disease of inherited syphilis does not appear to be much under the influence of the new treatment, more especially when we remember the variability shown by the evolution of these cases, their usually favourable prognosis, and the slow but almost certain improvement given by almost all forms of treatment. It is, above all, affections of the uveal tract which are under the influence of arseno-benzol (Stuelp, 65 per cent. and Colombo, 63 per cent.). Notably in iritis and irido-cyclitis the remedy yields brilliant results. (81 per cent. in Colombo's statistics). In urgent cases, in order to obtain a rapid improvement or cure, arseno-benzol should be exhibited, and in order to prevent relapses and to consolidate the cure, it should be followed by mercury. It should not be forgotten that even the classic mercurial treatment acts brilliantly upon iritis and irido-choroiditis, and much more quickly and surely in those diseases than in cases of choroiditis, especially since affections of the iris exact immediate attention from the patient and the medical man, do not remain latent and are not treated too late, as is often the case with choroiditis and choroido-retinitis. In retinitis and neuritis, especially when acute and of recent origin, arseno-benzol often gives good results. In atrophy of the optic nerve, arseno-benzol, like mercury, gives negative or almost negative results. The same remark applies to oculo-motor paralyses, often capable of being cured more or less quickly when treated soon after their appearance, but not capable of modification when several weeks or months have passed. As to sympathetic ophthalmia, the cases treated by arseno-benzol are still too few and the results too doubtful to draw definite conclusions. A. ANTONELLI.

(10) **Bar** and **Lequeux**, of Paris, have employed Nicolle and Blaizot's vaccine in five cases of gonorrhœal infection, namely, four cases of salpingitis in women and one case of suppurative dacryocystitis in a newly-born baby. With regard to the latter, twenty-four hours after the subcutaneous injection of ½ c.cm., containing 2½ drops of the vaccine and 7½ drops of physiological serum, the inflammation had diminished notably, and on the following day the condition was cured. There was no recurrence. The injection was followed by a trace of albumen in the urine and a slight febrile reaction. It is a little difficult to understand how the foregoing case (in which no bacteriological examination seems to have been made) can justify the authors in claiming, as they do, "that Nicolle and Blaizot's vaccine appears to be particularly active in ophthalmia neonatorum." SYDNEY STEPHENSON.

(11) In a second communication **Bar** and **Lequeux**, of Paris, speak of the case mentioned above as one of purulent ophthalmia complicated by suppurative dacryocystitis. So impressed were the authors with the new vaccine that it was pressed into the preventive treatment of ophthalmia neonatorum. Seventy-six babies each received 2½ drops of the vaccine immediately after birth, the usual instillation of silver nitrate being omitted. Three of these

infants (3.94 per cent.) developed ophthalmia, and in one baby the disease was of severe type. In that case curative treatment by the vaccine failed. The condition looked clinically as if it were of gonorrhœal origin ; but cultures were not made. The authors mention two other cases of ophthalmia neonatorum treated by the vaccine, in one of which it succeeded in arresting the secretion and in the other it failed. Bar and Lequeux speculate as to the cause of the diversity obtained by the vaccine in cases of ophthalmia neonatorum, but without reaching any conclusion. SYDNEY STEPHENSON.

(12) During a period of eight years (1906-1913) at the Lariboisière Hospital, Paris, **Morax** has treated 110 cases of gonococcal ophthalmia neonatorum by cauterisation with 2 per cent. solution of silver nitrate, hourly instillations of 20 per cent. argyrol, and free washing with boiled water. Excluding cases where lesions of the cornea were already present upon admission, he had fifteen instances of corneal mischief, of which nine terminated in limited perforation, not abolishing all sight. Conjunctival suppuration, even in the absence of complications, lasted from several days to two or three months. Speaking generally, the sooner treatment was begun, the shorter was the time the suppuration lasted. One of the earliest signs of improvement is that the infant opens his eyes of his own accord. In six cases Morax tried treatment with Nicolle and Blaizot's vaccine, supplied by the inventors themselves. As regards the duration of the affection, cases treated with the vaccine, silver nitrate, and argyrol did not differ from those in which the vaccine was omitted. The vaccine was used alone for several days, but Morax was constrained to add silver because corneal lesions made their appearance in two cases, and in others there was no obvious modification in the secretion or in the spontaneous opening of the baby's eyelids. In one case, however, the eyelids were open at the end of twenty-four hours after the injection. In conclusion, Morax cautions us against placing too great confidence in vaccine therapy, and states that silver treatment, of which the efficacy is established, should never be neglected.

SYDNEY STEPHENSON.

BOOK NOTICES.

The Royal London Ophthalmic Hospital Reports. Edited by J. HERBERT PARSONS. Volume XIX., Part iii., November, 1914. London: J. & A. Churchill, 7, Great Marlborough Street. Price, 7s. 6d.

The present volume of the "*Moorfields Hospital Reports*" includes a sympathetic sketch of John Cunningham Saunders, who in 1805 founded "The London Dispensary for Curing Diseases of the Eye and Ear," at No. 30, Charterhouse Square, the first special Hospital of any kind in England. John Richard Farre was appointed physician to the dispensary. A couple of years later Saunders suggested that ear patients should be excluded from the benefits of the charity, and gave as his reason that time and money were being exhausted by the attendance of numbers of incurably deaf persons who did not possess sufficient "refinement of reason to be thankful for intended benefit," but, on the contrary, became vindictive when the incurable nature of their malady was made known to them. The writer of this appreciation of Saunders (whose name does not appear) describes in appreciative terms his work on the treatment of infantile cataract by discission through the cornea, and his advocacy of belladonna in inflammation of the iris.

The volume contains a communication ("A pedigree of colour-blindness, including two colour-blind females") by the late Edward Nettleship, the material of which has been arranged by C. H. Usher. Other authors represented in the volume before us are Charles Goulden, J. Herbert Parsons, George Coats, Malcolm L. Hepburn, R. Foster Moore, and R. Affleck Greeves. Their respective communications will be abstracted in due course in the columns of THE OPHTHALMOSCOPE. Finally, the number includes the index to Volume XIX.

A Brief Review of the Work of Donders. By ERNEST CLARKE. London: Baillière, Tindall, & Cox, 8, Henrietta Street, Covent Garden.

This unpretentious little volume is a graceful tribute "to the undying memory of the great Donders." Its purpose is to remind the medical profession throughout the world in what the work of this famous Dutch pioneer consisted, and to instil into their minds the deepest feelings of gratitude and admiration. The subject has been approached from the practical side alone. Added to the *résumé* of Donders' work is a brief record of the progress that has since been made. Donders' first treatise was published, not in his own mother-tongue, but in English, and Ernest Clarke is to be congratulated on the kindly compliment he has paid his hero, by first publishing the present volume in Dutch, and subsequently giving the present volume to his English readers. R. H. ELLIOT.

Official Year-Book of the British Optical Association. Compiled by J. H. SUTCLIFFE, Secretary to the Association. 1914. Price, 3s. 6d.

An illustrated volume of 278 pages affording information of various kinds likely to be of service to members of the British Optical Association. Neither is the record altogether one of the optical industry, since we read that the sum of £170 has so far been contributed to the National Relief Fund and of £80 to the Prince of Wales' Relief Fund.

Report on the Ophthalmic Section of the Department of Public Health, 1913. By the DIRECTOR OF OPHTHALMIC HOSPITALS, Ministry of the Interior, Egypt. Price, P.T. 5. Cairo: Government Press. 1914.

In this Government paper A. F. MacCallan, director of ophthalmic hospitals, reports upon ophthalmic hospitals and progress in Egypt during the year 1913. It appears that twelve hospitals were at work during 1913, and that of these, four were opened during the course of that year. Permanent hospitals have been built in seven of the chief towns, and arrangements for building in the capital towns of five other provinces have been completed. There are still four provinces at present not provided with any form of ophthalmic service, "including those in which are situated the pyramids at Gîza, the tombs at Saqqâra, the temples at Luxor and Karnak, and the great dam at Aswân." The surgical work of the hospitals is carried on by twenty-one Egyptians, who have had special experience in eye work. They work under the supervision of four inspectors, excluding MacCallan himself. A total sum of £E20,605 is available each year for the relief of eye disease. The number of new cases treated has risen during the year to 40,670 and the total attendances of out-patients to 544,267. Elliot's operation of trephining has almost entirely superseded iridectomy for glaucoma, for reasons that are set forth in the *Report*. The director makes some useful remarks and criticisms upon the *technique* of the operation. It is significant that when iridectomy was the only operation undertaken for the relief of glaucoma, that operation was always performed by one of the senior surgeons. The adoption of trephining, however, enables MacCallan to confide the operation to his native Egyptian assistants. Details are given upon some other operations, such as those for cataract and entropion. Interesting details of blindness in Egypt are appended.

The *Report* deserves a wide publicity, and Mr. MacCallan is to be congratulated upon an admirable piece of work. SYDNEY STEPHENSON.

Glaucoma: a symposium, presented at a meeting of the Chicago Ophthalmological Society, Nov. 17th, 1913. Edited by WILLIS O. NANCE, M.D. and WESLEY HAMILTON PECK, M.D. Chicago: The Chicago Medical Book Company, 1914. Price $1.50 (6s.).

The editors have spared neither trouble nor expense in the production of this little book, which gives in its 151 pages the views of a number of eminent American surgeons who have made the study of glaucoma their speciality, as well as those of Lt.-Col. R. H. Elliot, who took part in the debate as a guest of the Society. The binding, the paper, and the printing are all alike excellent. As to the material of the discussion, this is guaranteed in quality by the inclusion in the list of contributors of papers of the names of Weeks, de Schweinitz, Jackson, Casey Wood, and others. The volume is "dedicated to Dr. Edward Jackson, Dr. John E. Weeks, Dr. George Edmund de Schweinitz, Lieutenant-Colonel Robert Henry Elliot, Honorary Members, by the Chicago Ophthalmological Society, in recognition of their splendid achievements in the domain of ophthalmology." S.P.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

To the Editor of THE OPHTHALMOSCOPE.

SIR,—In May last I published in THE OPHTHALMOSCOPE a clinical memorandum entitled "Iritis associated with the diplobacillus (Morax-Axenfeld)." My attention has been called to a similar memorandum by Hanford McKee, in THE OPHTHALMOSCOPE, 1909, page 531, on the same subject. I much regret that I overlooked this article, and the omission is the more reprehensible in that it is my duty to read the proofs of this journal every month. I had therefore no excuse for not knowing of McKee's article. I tender my apologies to Dr. Hanford McKee.

I am, yours, &c.,

ERNEST THOMSON.

2, SOMERSET PLACE,
GLASGOW.

NOTES AND ECHOES.

Ophthalmological Society.

THE annual Congress of the Ophthalmological Society of the United Kingdom will be held this year on Thursday, Friday, and Saturday, the 22nd, 23rd, and 24th April. As on former occasions, the meeting will be in London. On April 22nd a discussion on "Ophthalmic injuries in warfare" will be opened by Mr. W. H. H. Jessop. On the 23rd a discussion on "The causation and treatment of detachment of the retina" will be opened by Messrs. A. Maitland Ramsay, Leslie Paton, and Stephen Mayou. A clinical meeting will take place at 3 p.m. on the 23rd at the Royal London Ophthalmic Hospital, City Road, E.C.

* * * *

Middlemore Lecture, 1915.

DR. T. HARRISON BUTLER, editorial secretary of THE OPHTHALMOSCOPE, will deliver the Middlemore lecture for 1915. The subject of the address is not yet announced.

* * * *

Appointments.

ARTHUR CYRIL HUDSON has been appointed ophthalmic surgeon in charge of out-patients, St. Thomas's Hospital, London.

W. P. TINDALL-ATKINSON has been appointed radiographer to the Royal Westminster Ophthalmic Hospital, vice G. A. Simmons.

A. Nimmo Walker has been appointed consulting oculist to the Brownlow Hill Workhouse of the Parish of Liverpool.

L. J. Pisani has been appointed consultant for ophthalmic cases to the asylums of the Metropolitan Asylums Board until March 31st next, in succession to Angus MacNab. Rumour has it that the last-named gentleman was not killed, as reported, but is, after all, a prisoner of war in Brussels. His many friends welcome even the possibility, and trust that in his case rumour may be firmly based upon fact. Ophthalmic surgery can ill-afford to lose so conscientious a worker.

G. W. Spencer has been appointed ophthalmic registrar at St. Thomas's Hospital, London.

* * * *

A Medical Dispatch Rider.

MR. A. B. CLUCKIE, one of the surgeons to the Bath Eye Infirmary, and a former senior house surgeon to the Royal London Ophthalmic Hospital, has joined the corps of Motor Cycle Dispatch Riders for active service. Mr. Cluckie holds the diploma of ophthalmology of the University of Oxford.

* * *

A Midwife's Error.

AN Exeter midwife, Florence Annie Parkes by name, was fined £5 recently for failing to notify a case of ophthalmia neonatorum. The defendant did not see the infant until four days after its birth, and then having expressed the opinion that the child was suffering from inflammation of the eyes, probably through being somewhat exposed, left a lotion with which the eyes were to be bathed. The health visitor for Exeter saw the child ten days after its birth, and had it removed to the Eye Infirmary. It was stated in evidence that the baby would probably become totally blind.

* * * *

"Soap and water and opticians."

Dr. Charles H. May has recently called attention to the fact (*New York Medical Journal*, March 7th, 1914) that many opticians are lax as regards the cleanliness of their hands. He raises the question whether infection may not be conveyed through the fingers in the fitting and adjusting of spectacles and eye-glasses, and incidentally recommends that a wash-basin with running water and liquid soap should be part of the visible equipment of the store. Such fixtures, as he remarks, can be obtained in attractive form, do not occupy much space, and tend rather to add to than to detract from the general good appearance of an establishment.

* * * *

Death.

The death is announced at the age of 54 years, of John Sanson Adams, of New York, one of the most prominent specialists on diseases of the eye, ear, nose, and throat, in the United States.

* * * *

Oxford Ophthalmological Congress.

According to a preliminary notice issued by the honorary secretary of the Congress, Mr. Bernard Cridland, the next meeting will be held at Keble College, Oxford, on the 15th and 16th of July. It is proposed to devote the first day to demonstrations only, and a special appeal is made to members to assist with specimens, cases, operations, or novelties. On the second day, a discussion has been arranged dealing with industrial diseases of and accidents to the eye. Communications will be made by Dr. Frank Shufflebotham, Mr. T. Harrison Butler, Mr. T. S. Maitland, Mr. J. Jameson Evans, Dr. A. C. Norman, Dr. William Robinson, Mr. S. McMurray, Mr. C. A. Pooley, Dr. J. Gray Clegg, Dr. E. L. Collis, and others.

THE OPHTHALMOSCOPE DIARY.

1915.

Midland Ophthalmological Society	February 2nd	Birmingham.
Royal Society of Medicine : Section of Ophthalmology	February 3rd	1, Wimpole Street, London, W.
Ophthalmological Society of the United Kingdom	April 22nd, 23rd, and 24th	London.
Royal Society of Medicine : Section of Ophthalmology	June 9th	1, Wimpole Street, London, W.
American Ophthalmological Society	July 6th & 7th	New London, Conn.
British Medical Association : Section of Ophthalmology	July 7th to 9th	Cambridge.
Oxford Ophthalmological Congress	July 15th & 16th	Keble College, Oxford.

THE

OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. XIII.—No. 3.] *MARCH 1, 1915.* [TWO SHILLINGS.

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ORIGINAL COMMUNICATIONS.

[FROM THE LABORATORY OF OPHTHALMOLOGY OF THE HARVARD MEDICAL SCHOOL, BOSTON.]

THE EFFECT ON ACCOMMODATION OF THE VISCOSITY OF THE LENS.

BY

WALTER B. LANCASTER, M.D., AND EDWARD R. WILLIAMS, M.D.,
BOSTON, MASS., U.S.A.

THE fact that the lens is a markedly viscous body was discovered by us in the course of some experiments on fatigue of accommodation.

Let a subject be seated at a bench with his head fixed by a suitable head rest giving support to forehead and chin. Provide a test object on a carrier sliding freely along a scale graduated in mm., the motion being forward and back along the line of sight of the eye in the primary position. The whole apparatus, including head rest, should be firmly attached to the bench and adjustable as to height. To simplify the problem test only one eye at a time.

Measure pp., using such a lens as may be needed to make the pp. fall between 33 and 20 cm. Measure pr., using such lens as may be needed to make pr. fall between 33 and 50 cm., because better measurements can be made at these distances than further away or nearer the eye. Reduce measurements to diopters. Now place the test object 1/3 nearer the eye than its pp. measured in D.: let the subject of the experiment fix it steadily and with every effort to see it clearly. For example, if with a + 1·50 sph. a subject has a pp. of 25 cm. = 4 D., his real pp. reduced to diopters is $4 - 1{\cdot}50 = 2{\cdot}50$ D. If the test object is placed 1/3 nearer measured in D, this will be $2{\cdot}50 + 1/3$ of $2{\cdot}50 = 3{\cdot}33$; add 1·50 and we have 4·83 D. = 20·7 cm. Let him fix the test object at this distance steadily and signal when it becomes clear, while you record the time. At first he will, of course, report that the test object is quite blurred, and he may express the opinion that it is of no use to try to make it clear, he cannot do it. Simply exhort him to do his best. In less than 2 minutes he usually will say that it is getting clearer and soon he will say it is quite clear and in focus.

Another experiment is the following: Take pp. and pr. as before, then let the subject fix the test object placed at his pp., let him move the test object himself nearer or farther along the scale as may be needed to see it clearly focussed, but always keep it as near as possible without blur. Every ten seconds you take a reading of the position on the scale of the test object as it is held by the subject. Continue this for ten minutes or longer. At first the subject is likely to shift the test object forward and back a good deal so that when you plot your readings in the form of a curve, you get a curve of frequent and steep changes (Fig. 1, A). This is in part due to inexperience and uncertainty as to his standard of what is clear and what is blurred, but it is largely due to a retinal factor which makes itself felt when one fixes a small point as steadily as possible, and is independent of what part of the range of accommodation it occupies. Waves of blur come over it and more or less quickly pass away. This gives a very irregular curve. Since we are attempting to study the curve of accommodation, this retinal factor enters as a seriously disturbing element. Fortunately it can be very largely, at times wholly, eliminated by the simple device of not fixing or trying to fix one geometrical point steadily, but causing the eye to roam over the small test object from point to point incessantly, now fixing the top, now the bottom, now one side, now the other. These small movements in no way interfere with steady focussing. In addition to the roaming fixation, let the subject wink often. Thus instructed, and after one or two trials to learn how to manage the apparatus, the curve becomes much more even and takes a characteristic form (Fig. 2. B. C. D.). During the first few minutes it rises rapidly, but gradually bends over and tends to become horizontal. If the experiment is continued long enough, it further begins to show a decline ; this indicates fatigue (Fig. 3).

A third experiment is this : Take pp. and pr. as before. Let the subject fix the test object which is rythmically moved forward and back about ten or 12 times a minute, from pp. to pr. along the scale. In order to stimulate maximum focussing and maximum relaxation it is well to move the test object a little nearer each time than the pp., and a little farther than the pr. Keep this up ten or twenty minutes or longer. Then quickly take pp. and pr. You will find pp. is about where it was when you started ; pr. will be nearer.

A fourth experiment : take pp. and then pr., and then pp. again and then pr., and continue at regular and short intervals, but without haste, to do this for 10 to 30 minutes. You will find that pp. does not vary beyond the unavoidable small variations which constitute the margin of error. Pr. tends to come nearer. If kept up long enough pp. will show a falling-off (measured of course in diopters) due to fatigue.

In attempting to interpret these experiments, we assume the substantial correctness of the Helmholtz theory of accommodation and of the observations of Hess and many others on the relaxation of the zonule during strong accommodation, sometimes allowing the lens to move under the influence of gravity or of movements of the eyeball. (See Hess's monograph, vol. VIII. of the *Graefe-Saemisch Handbuch*, 2nd or 3rd edition.)

Let us follow the events as they occur in our subject. Made to fix a test object at his near point, he contracts his ciliary muscle with vigour. The suspensory ligament is relaxed ; the lens is no longer held in a partly flattened shape by the tension of these suspensory fibres on its capsule, it is free to take on its proper or natural shape and it does this. Whether it is by virtue of the elasticity of its fibres or other constituent parts, or whether the elastic impulse resides in the capsule or some other structure, it is not necessary for our present purpose to decide. The point is that the lens can take up the slack which would otherwise result from relaxing the zonule when the contraction of the ciliary muscle draws forward the posterior ends of the suspensory ligament. It is not able to take up all this slack under all circumstances, but, as is well known, when the lens becomes older, its capacity to change its shape, and so take up this slack, is diminished.

The fact that the ciliary muscle produces accommodation indirectly, and not by any direct action on the lens, is important in many ways. The eye is saved from the strain which would surely result in far greater degree with the onset of presbyopia, if by more forcibly contracting the ciliary muscle, direct pressure could be brought to bear on the lens, and so a bit more accommodation could be squeezed out of it, so to speak. Instead of this, all we can do is to relax the zonule, and let the lens do what it will to change its shape. More powerful contraction of the ciliary muscle is fruitless, since it merely so slackens the zonule as to allow the lens to sag or sink under the influence of gravity. But how about the increase of accommodation and approach of the pp. so often observed after eserine? Hess explains this as only an apparent, not a real approach of the pp. He says that it seems to the subject being tested that his pp. is nearer ; this is only because his pupil is so much smaller, and therefore the circles of diffusion are so small that he thinks his pp. is nearer than it really is.

This is where Hess and his pupils left the problem. Let us go a step further. If after the suspensory ligament is fully relaxed, any further increase of the accommodation takes place, so that the pp. comes appreciably nearer, it must be because the lens continues to grow more strongly refractive, doubtless more convex. This change in shape is due to elasticity; the slowness of its change is due to viscosity.*

We think the approach of the pp. caused by eserine is of this same nature. The ingenious explanation of Hess certainly falls down when applied to our experiments, where no miotic is used. The change in the size of the pupils is only the small change which goes with accommodation and convergence, and occurs at once on focussing for the near point, not gradually in the course of several minutes as does the approach of the near point in our experiments. Our experiments show that when the zonule is relaxed there is an initial change which occurs quickly (less than a second), but that the change does not stop there, rather the lens continues to become more convex, though at a slower and slower rate. The idea which we wish to convey is that the force which brings about the increased convexity of the lens is opposed by another force which it overcomes only gradually. There is a time element. We call the first force the elasticity of the lens, capsule, etc.: for the second we suggest the name viscosity, for the time element is the essence of viscosity.

Schmidt-Rimpler made some measurements of the velocity of accommodation, and alluded to the viscosity of the lens as a possible, but unimportant, factor. This is the only reference to this property of the lens that we have found (*Arch. f. Ophthal.*, Bd. XXVI, 103). Other and more accurate measurements of the velocity of accommodation were made later by several experimenters, none of whom mentions viscosity. (See Seashore, "On Monocular Accommodation-Time," *Studies from Yale Lab. Psychol.*, 1893.)

For a fuller discussion of these experiments, including the behaviour of the pr., see Lancaster and Williams in the *Trans. Amer. Acad. Ophthal. and Oto-Lar.*, 1914.

Explanation of the Figures.

Fig. 1. A and A¹.—First tests on two subjects (both good observers) fixing Duane test object, which they are instructed to keep as near the eye as possible without blur, if they get it too near move it off, if they can do so without blur, move it nearer. Accommodate intently and strongly. Without being told to do so, each, in the desire to fix as intently as possible, selected some point of the test object and kept his eye fixed on that as steadily as possible. The curve is made of readings taken every ten seconds. Notice the frequent and steep changes in the curve indicating uncertainty and a ceaseless effort to secure clear images by shifting the test object forward and back. Had readings been taken every five seconds the curve would have been even more irregular.

Fig. 2. B and B¹.—The same two subjects as in Fig. 1, in a similar test, except that they had been instructed to keep the eye moving its fixation point from one part of the test object to another and to wink freely. They stated, and the curves show, that this caused most of the periods of blur, which were frequent, though fleeting, in the first test, to disappear in the second. To this must be added the effect of experience and a better understanding of the experiment. The curves are fairly free from large irregularities.

Fig. 2. C and D.—Two curves made by subjects who had done the experiment many times. Notice that the curves are practically free from recessions. In these curves we have largely eliminated the uncertainty due to inexperience, as well as the periods of fleeting blur of retinal origin. The observers are rarely in doubt whether the object is in focus. These curves may be regarded as the type. Plotted from observation taken every ten seconds.

Fig. 3.—Curve made as in Figs. 1 and 2, but continued 45 minutes The first half shows the same type form. The near point increases from less than 3·50 D. to nearly 5·00 D. After 35 minutes there is a decided drop in the curve, due, no doubt, to fatigue. There is also a marked increase in irregularity, which may be due to fatigue of attention. Observations were taken every ten seconds, but this curve is plotted from observations one minute apart, the intervening ones being omitted.

Fig. 4.—These nine curves are from eight subjects, ranging from 13 to 60 years of age. Only the initial and final readings are given.

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* If anyone has a better word to suggest we shall welcome it; what we are contending for at present is the fact, not its label. We think viscosity is better than hysteresis or plasticity, or any other word we have thought of.

Fig. 1.

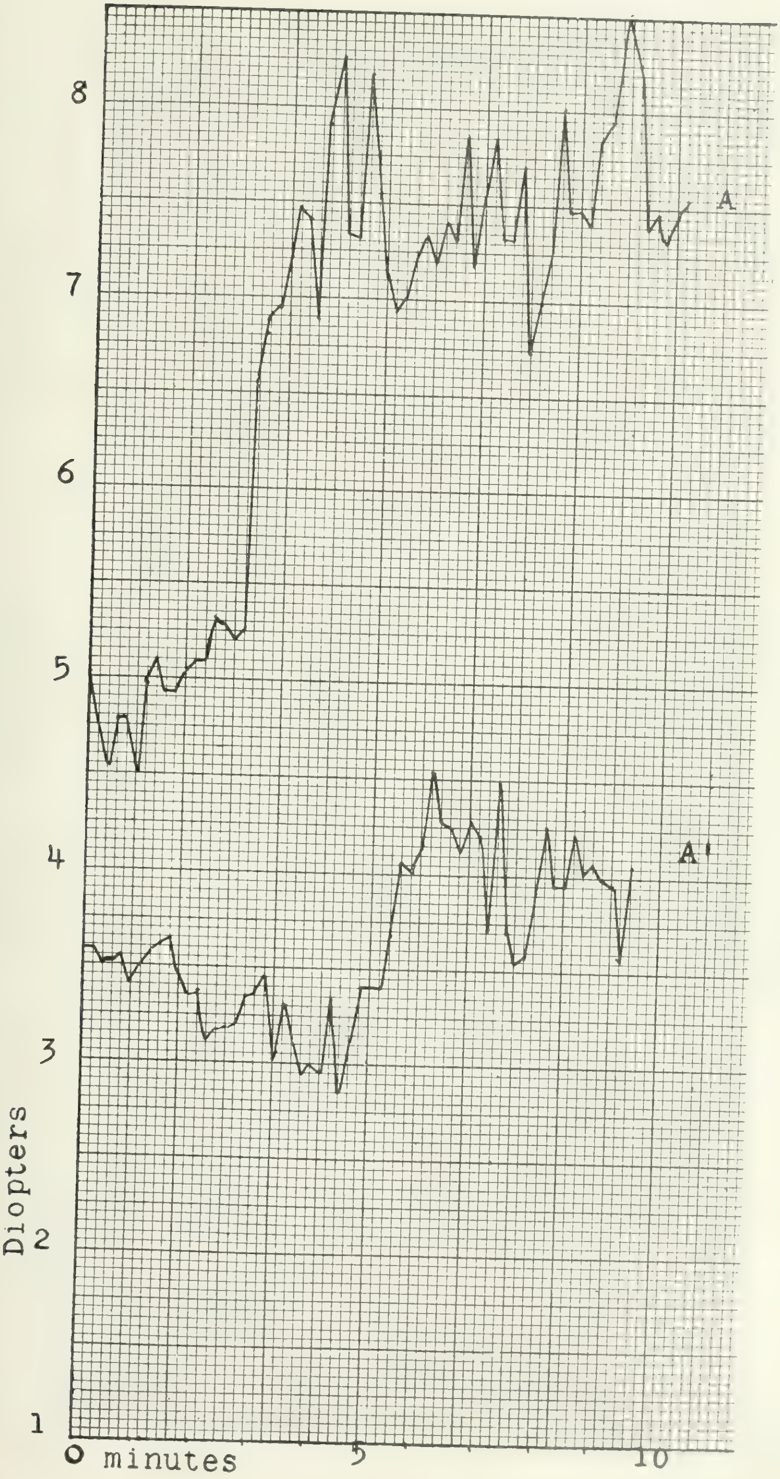
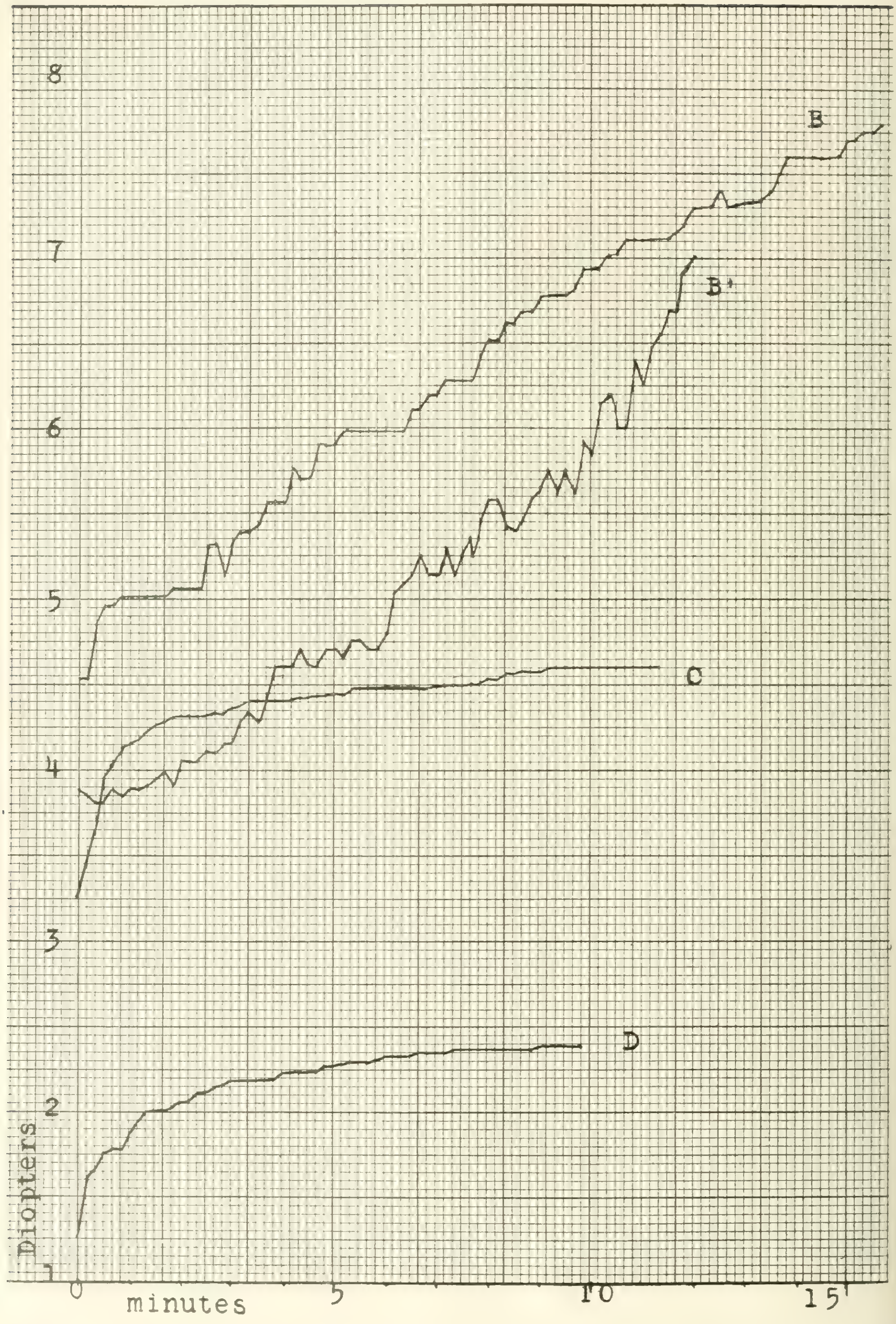


Fig. 2.



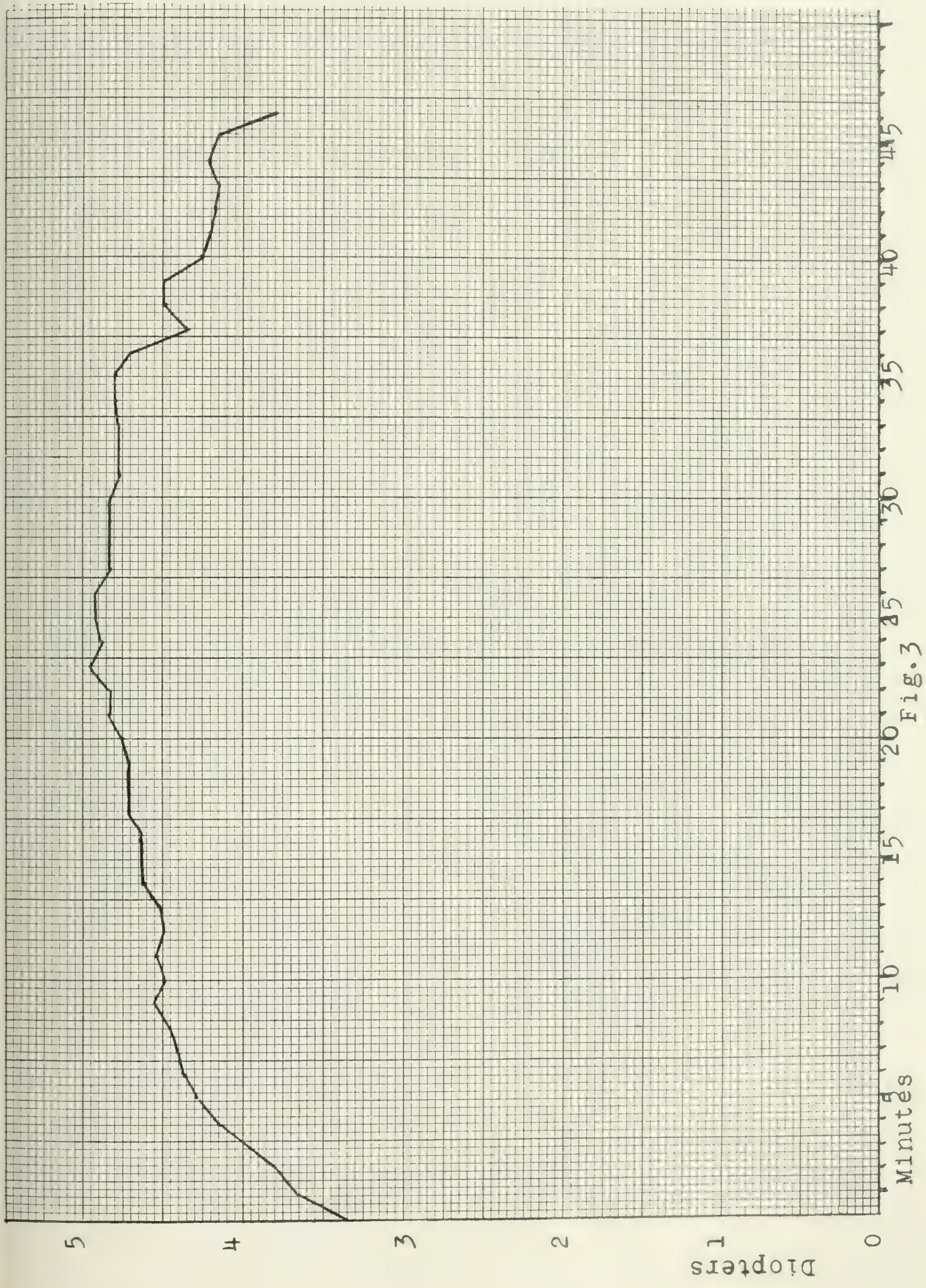


Fig. 3

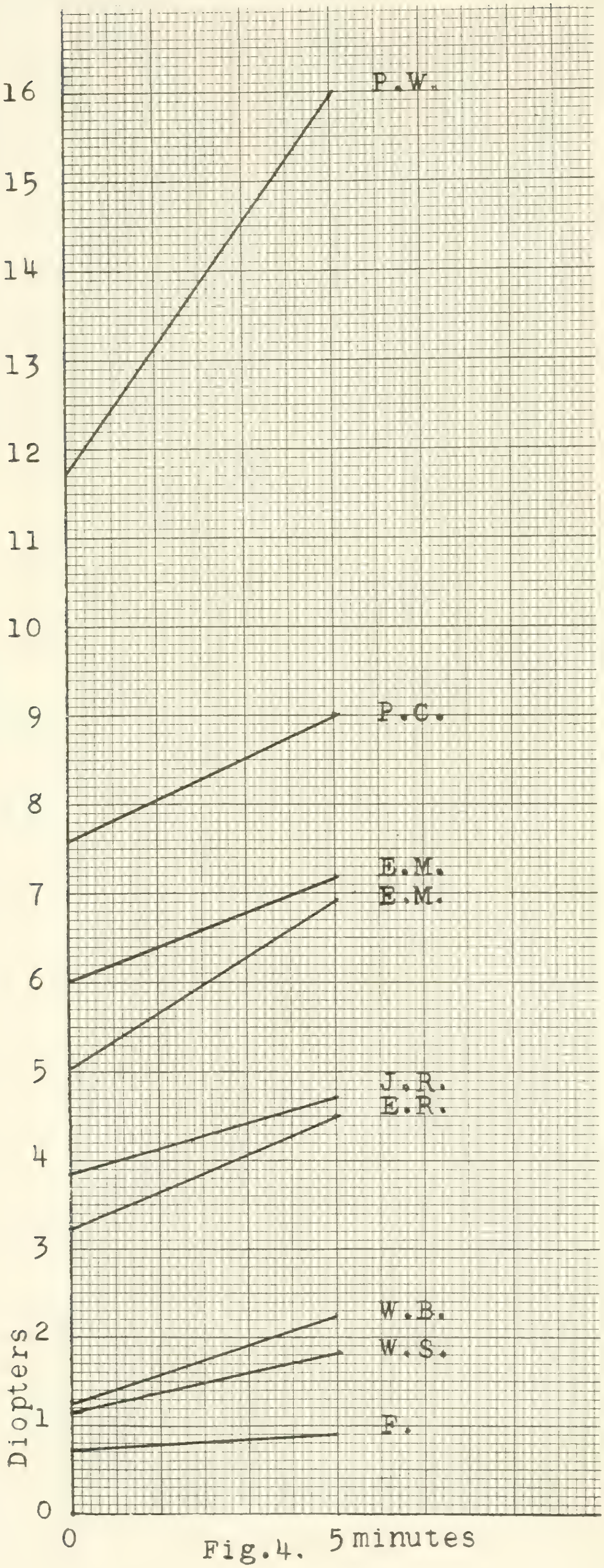

Diopters
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
0
5 minutes
P.W.
P.C.
E.M.
E.M.
J.R.
E.R.
W.B.
W.S.
F.

Fig. 4.

" EYE " IN SPORT.

BY

ROBERT W. DOYNE, M.A., F.R.C.S.

ONE-TIME READER IN OPHTHALMOLOGY IN THE UNIVERSITY OF OXFORD.

(*Concluded.*)

Shooting.

On the subject of shooting there is much to be said, for in this sport the use of " Eye " is more disputed than anything else, but it must be remembered at the outset that there is more than one way of using the eyes in shooting. This should be clearly understood, for those who argue one way too often forget that they are not using a common standpoint. Gun-shooting and rifle-shooting usually represent two different kinds of shooting, but there are a few who do shoot with the rifle as with the gun. In the ordinary use of the gun, there are at least three different ways in which it is practised, and the object may be aimed at in at least two different ways, and, if a moving object, hit in at least two different ways. The object may be aligned with one eye along the midrif, or the gun may be pointed by judgment, that is, by the training of the muscle-sense, to bring it up true to the observed mark. This, although very few recognise the fact, is the procedure adopted by almost all trained shots, whereas one-eye alignment is supported as the ordinary procedure by a large number, including most, perhaps, who are looked upon as authorities, such as teachers at shooting-schools and so on. Now, in shooting at a fixed mark there are the following requirements, the estimation of the position and direction of the object, as bringing up the gun in the direction of the object, as making true the aim and the pulling of the trigger. The beginner takes each step separately, but when he becomes a trained shot all these steps merge into one or may merge into one. This is especially the case with a moving object. As the individual becomes trained, these steps automatically, as it were, merge into one, so that the very fact of seeing the object puts in motion the train of impulses which automatically excite each succeeding act instead of a voluntary impulse for each. In fact, a physiological train of action is set up by seeing the moving object. It is the training of this physiological power which takes place at the shooting-school or in the earlier attempts of the beginner. Each act is separately thought out and a brain impulse given for its performance. The object is aligned by the right eye, which, usually, is what is called the master eye. Then, if it be a moving object, the gun is separately swung or chucked, and, when the gun is sufficiently in front of the moving object, then comes the deliberate act of pulling the trigger. Now, in the ordinary normal man, the estimation of the distance and position of an object is made by the use of both eyes. The gun is brought up in that direction and the beginner has to concentrate his attention upon his right eye instead of upon both, align the barrels at the moving mark, and execute the following manœuvres in sequence. With practice and experience the gun is brought up more and more truly to the object which is being fixed by the two eyes, so that the alignment is secured without the action, as it were, of the master eye, even although the master eye may, in consequence, take a position of alignment with the object. Automatically, when the swing has given the gun the correct position in front of the bird, the fact of the gun being in such position gives the impulse to the finger to pull the trigger. All this is really the training of the muscle-sense, which can be brought to a great pitch of perfection. Analogous training of muscle-sense can be developed in various ways. For instance, muscle sense is trained to a very high degree in the marvellous performances of acrobats, but the most familiar instance of the training of muscle-sense is in the training of a pianist. An experienced pianist, reading new music with his eyes fixed on the book, will strike correctly with his little finger a note down in the bass. In exactly the same way an experienced shot directs a gun at the desired object, although the fact that he is engrossed with the object prevents him analysing the means which he is adopting. There are many ways of proving this practice. If a man holds a gun in his hands and looks at a mark with the intention of firing at it and if directly before he brings up his gun, he shuts his eyes, he will find that he has found the aim fairly accurately, seldom quite accurately, for all the time the gun is coming up, he is, under the usual circumstances, correcting his estimate of the aim. Another way in which the writer considers he has practically proved this point is in the case of a very experienced trainer of shooting. The writer gave him spectacles with strong prisms in each eye, in order to make the object look about a yard to the left of where it really was, and he missed consecutively to the left. A little thought shows that this is conclusive evidence, for if he had brought the gun up and aligned the mark with the right eye through the prismatic glasses, he would have aligned it truly, because he would have seen the mark and the barrels under the same conditions and so would have brought the gun up true to the mark through the glasses. This would have been a yard to the left of where it actually was, and he would have brought his gun up according to the estimate he had made and communicated to his muscle-sense. The writer has tried this experiment himself and the shot went, more or less universally, in the direction of the apparent position of the object. It will be frequently noticed that people, who are discovered to be, as it is called, left-eyed, in consequence of their bad shooting, although they have often shot for years, do not always miss, but are sometimes quite successful. At other times, especially when they are particularly anxious to shoot well, they invariably miss. The explanation of this is quite simple, according to the sequence of the development of a trained shot which the writer has above described. In these cases, the individual has trained his muscle-sense, and, as long as he uses merely muscle-sense and two-eyed fixation, he shoots to a greater or lesser degree truly, but if he becomes anxious to succeed he harks back to the earlier stage in his training, when he aligned with the barrels, and he picks up the alignment with the left eye instead of with the right. Consequently, he misses away widely to the left, whereas, if he were right-eyed, it would not make so much difference, but even in this case, it would make him much slower, because a greater length of time is required for associating different thought-out details. It is a common experience for a man to miss when he is particularly anxious to hit, and this splitting-up of the trained physiological process is responsible for making him slow. Of course, it is possible for a man to perpetuate the alignment and give a bigger swing or chuck in front to compensate for the slowness in time entailed by the process, but the fact of both eyes having to be used and the concentration of one eye after fixing the object with both is, in the process of training, very readily eliminated. As the writer has said before, there are different ways in which different people shoot, and some may perpetuate the lengthier process with which they have begun. Another manner in which a very few do shoot and sometimes even become fairly successful shots, is shooting at a fixed point in front of the object without swing. Of course, such a process is liable to enormous variation according to the latent period of the individual, for it depends on the accuracy of his estimate under all sorts of different conditions. For instance, in partridge shooting he would have to shoot at about thirty feet in front of the bird for a crossing shot, and this would be influenced very greatly by the strength of the wind impeding or aiding the flight of his shot. In fact, the condition is snap-shooting when a fixed point is shot at without swing or chuck. Binocular fixation and aligning with the mental eye is wonderfully illustrated by the remarks made by Payne Galwey in writing of the influence of the left eye in trying to aim to the left. Such influence of the left eye is really the influence of binocular vision as compared with right-eyed vision and amounts to a sort of struggle of alignment by mental vision and the right eye. The advantage of binocular vision is not only speed, but also a better view of what is taking place in the direction of the object, for if the right eye only is being used a very large wedge is shut out beneath the object. If both eyes are used there is only a very small space completely occluded a little to the right, so that if the bird falls or flies downwards and the right eye is being used for alignment in fixing the object, the bird has to be continually re-sought and aligned as long as it is dropping in flight, whereas if the object is aligned by means of the mental eye, it is always in view.

Finally, it is beyond doubt that many people do shoot by alignment by muscle-sense, as, for instance, those who shoot from the right shoulder and are blind in the right eye. This fact establishes beyond any question the possibility of such alignment, and the only point for discussion is not whether it is done, but which is the most frequent method, and the writer has pointed out how involuntarily the trained shot falls into alignment by muscle-sense from one-eyed alignment. The following article, written for *The Country Gentleman*, August 12th, 1911, illustrates the process which takes place in shooting.

The evolution of a first-class shot.

"What exactly a man has done with his gun when he brings down the bird at which he has fired is a constant subject for discussion at the covert-side, and for argument in the sporting papers. During last winter a lecture I gave, which merely touched on this subject among others, gave rise to a somewhat acrimonious discussion in the columns of a contemporary journal, and certain persons, not understanding physiology, and not having carefully read my lecture, tried to make out that I had said all sorts of silly things, and on that assumption argued at length that I was wrong.

The question is a very complex one indeed, differing under different conditions, and not always constant under the same conditions. In my lecture I stated that I was only dealing with the trained shot, but now I propose to treat the subject briefly from the evolutionary point of view, showing how the normal-eyed learner, beginning with the use of one eye, develops the highest degree of what I call "Eye"-"Eye," being the product of the function of the special sense of sight and muscle-sense controlled by brain judgment.

There is no doubt whatever what a boy does when he first gets his new gun. He can describe it accurately, which is in contrast with the trained shot, who never can describe or knows what he has done. When a boy begins to shoot he brings the gun up to his shoulder, looks along the barrel with his right eye, and moves the gun until he brings the bead on to the mark at which he is going to fire. When he has got it in line he pulls the trigger. He has no need of muscle-sense or brain judgment, except in its most simple form. When, however, he shoots at moving marks at varying distances, another brain process has to be called into play. He has to form an estimate of how far off the object is and how fast it is moving. Without entering into further explanation, it will be seen that the judgment of one depends upon the other, and it is obviously an important estimation that has to be made.

I must now describe the physiological process by which the shooter forms an estimate of the distance of the object. The process resembles closely the principle of most range-finders. When an object is looked at, each eye is directed towards it; the nearer the object is the more have the eyes to converge upon it. This convergence is performed by the two muscles that pull the eyes inwards. The farther off an object is the less have these muscles to contract; the nearer it is the more they have to contract, and the brain estimates the distance of the object by the amount of contraction that these muscles have to perform. Very well, then; the shooter has for this purpose to make use of both eyes, and when he has done so, in this early stage of his evolution, he again acts in the way that he adopted when firing at a fixed mark, and, giving up binocular vision, he looks along the barrel with his right eye, bringing the bead to bear upon the object, and when he has made due allowance for the movement of the object he decides to pull the trigger, and for this purpose the impulse is sent down from the brain to the forefinger of the right hand.

From the constant bringing of the gun up to a fixed mark or to a moving mark in this early stage of his education, another function is beginning to be developed—namely, muscle-sense. I should here briefly describe what muscle-sense is. It is the relative association of certain groups of muscles to perform a certain act. A very good instance of muscle sense is the conveying of food to one's mouth at the point of a fork. It is, when you think of it, a very complicated act. The muscles of the arms and fingers have all to act in a certain way, so that the object is conveyed accurately to the mouth. The least over-action of one muscle or under-action of another would bring the fork against the nose or chin, but the action of each group of muscles is so regulated that the desired movement becomes in the highest degree correct. Another good instance of the training of muscle-sense is seen when anyone begins to learn to ride a bicycle or to drive a motor. The movements of the steering-bar at first are very gross, and the cyclist wobbles from side to side, the result of the muscles over-acting; but very quickly the group of muscles in use acquire the habit of so working together that only sufficient movement of the steering-handle takes place. Wonderful instances, again, of muscle-sense are seen in the balancing feats of jugglers, where muscle-sense is developed to a very remarkable degree. Applying this to the gun, it will be found that at the beginning of the shooter's education the gun does not come up readily to the aim, but by varying voluntary efforts is finally brought to the correct position, and it is this muscle-sense that becomes highly and accurately developed in the experienced shot.

Returning, then, to what takes place when the shooter begins to aim at moving objects, we find that by the action of both eyes he has to form an estimate of the distance of the object. Next, by muscle-sense, he brings the gun to his shoulder more or less in the direction of the object: then, looking along the barrel with his right eye he makes the aim true, and when he has made due allowance by " swing " (a subject with which I do not propose to deal) he deliberately pulls the trigger. This sounds a somewhat lengthy process, and so it is, and the beginner usually has very great difficulty in hitting the moving object. It will be easily understood that the means of shortening the process would be by grouping and associating the various acts together, and this is what actually happens in the evolution of the shooter.

Now these processes are :—(1) The estimation of the distance of the object by the use of both eyes. (2) The grouping of the muscles to bring the gun up truly to the shoulder, *i.e.*, muscle-sense. (3) The correction of the aim by the sight. (4) The pulling of the trigger. When these four acts are grouped into one act, each depending on the other, instead of being separate voluntary brain acts, we get the perfectly-trained shot.

We have not got by any means so far as this yet, and I will proceed to describe the evolutionary process. So far the estimation of distance and the muscle-sense in bringing the gun to the shoulder are separate acts, but they are quite early associated, so that the gun comes to the shoulder at the same moment that the estimation of distance is made. But this estimation has involved the use of both eyes, and for the aim the use of the right eye along the barrel alone is at this stage required, so the binocular performance of the eyes has been given up. After follows the separate voluntary act of pulling the trigger. Now, some shooters get no further than this, and they are recognised as slow and poking shots. But the development of the shooter should and generally does proceed until the muscle-sense becomes so highly developed that it is blended with the aim. In other words, the gun comes up at once true—that is, parallel with the central visual line which represents the mental line of vision, the product of the two eyes which are both already at that time in use estimating distance and speed. Such a line is one drawn from a point midway between the eyes to the object fixed by the two eyes.

Now I wish to impress this point very clearly, for it is here that mistakes and misunderstandings occur. The habit or action which has been hitherto adopted of aiming with the right eye will ensure that the shooter more or less adopts the same position as if he were aiming with the right eye. Therefore, the actual direction of the gun will be more or less in alignment with the right eye, although he is not using the right eye for that purpose, the alignment being made, as I have said, parallel with the mental line of vision, which is, as I have described, the product of both eyes. This blending of muscle sense in bringing up the gun with making the aim true to the mental line of vision and with the use of the eyes in judging distance, will not be a sudden definite step, but a gradual one, and, consequently, for the correction of aim the shooter may fall back upon his earlier right-eye alignment, especially at such times when he is particularly anxious to shoot well, or is nervous after missing several shots. Now, this dropping back to correction of aim by single-eye alignment will be interfered with, if the left eye happens to be the master eye, for the bead and the object will be the chief points in alignment; and if the left eye happens to be the master eye it may pick up the bead and the object instead of the right eye, the consequence being that the gun will be pointed far away to the left, whereas, if the right eye be the master eye, the going back to the single-eye alignment will merely tend to make the shooter slower or " poke ". You will understand from this explanation how it is that the men with the left master eye do not always miss, but only when they become particularly anxious to make the aim true, and thus give up what they have unconsciously acquired, and do not know what they have acquired—*i.e.*, aim by means of central visual line. It will be recalled that, when they do not care if they hit or miss, they may often shoot well, in which case they have not made the attempt to make the aim true by single-eye alignment, and it would also explain how it is that when the gun is cast off to the left master eye, a particular individual who happens to be left-eyed ceases to miss.

We have now got as far as this. The estimation of distance and the bringing the gun up, true to the central visual line are performed as one act, corrected occasionly, it may be, by master eye alignment; and there is only one other voluntary act left—that of pulling the trigger. Subsequently this becomes associated with the other acts in this way. Instead of being a separate voluntary act, the pulling of the trigger becomes associated with and set up by the fact of the gun being swung to a point that the shooter has associated as the correct one for the discharging of the gun, and when this is accomplished, the perfect shot is evolved—that is to say, the mere sight of the object excites the following reflex acts: estimation of distance, bringing the gun up to the correct aim, swing to the proper degree, and pulling the trigger. In such a case these acts are not separate brain initiations, for a reflex act is one that, as it were, takes place automatically at certain excitation, instead of being initiated as a voluntary act.

I have now given, briefly and sufficiently clearly, I hope, to be understood, the act of shooting. This short sketch, for want of time and space, is not elaborated to any extent by argument, nor is this the time to describe the experiments I have made to prove my point. They have largely been carried out at the shooting school of Mr. Richmond Watson, at Perivale, Middlesex, to whom I am deeply indebted for the kindness and courtesy he has shown me and for placing at my disposal all the elaborate arrangements he has for teaching shooting. I have marvelled at the intricate knowledge he has in detecting at once the peculiarities of his pupil, and his ready explanation of the means of overcoming faults. No one should accept the designation of being a "rotten shot" until he shall have given him or some other good teacher an opportunity of pointing the way to become a trustworthy shot. All his methods are sound, and although perhaps we do not place the same interpretation upon certain points, nevertheless my theories tally completely with his practical instruction.

Rifle shooting is, of course, different from ordinary sporting gun shooting. Occasionally, a rifle is shot like a gun, but, as a rule, each shot is a separate process, and the rifle is aligned afresh when fired from the right shoulder each time by the right eye. Allowance has to be made for wind, weather, and time of day. There is a somewhat remarkable fact about this way of aiming. Supposing a man, without any anomaly of muscle balance, that is, without any of the error called heterophoria, aims with his right eye along the sights, making the fore-sight correspond with the back-sight, while he looks at a target with the left eye, he should score a bullseye, even though there be placed in front of the sights of the rifle a card or some object obstructing his view between the sights and the target. This result is due to the fact that the eyes take the same direction, so that, if he sees the target with one eye and the sights only with the other, truly co-ordinating the sights, the bullet will travel in the direction in which the other eye is looking. If he possesses any error of heterophoria, he is able to learn to obviate the effect of the error by looking above or below to the left or to the right of the target to the required degree. The amount, of course, has to be learned by experience. This entails keeping both eyes open in shooting, a rule that is almost universally unobserved, especially as shooting is generally practised under favourable conditions, when no extra help is needed like that which would be accorded by keeping both eyes open. The sort of help that is derived from shooting with both eyes open is avoidance of spasm of the focusing muscle and very great increase in the illumination of the object which is being fired at. For instance, if a hostile force were moving along under a hedge in the twilight, it might be quite possible to see it, if both eyes were open, whereas aligning it with one eye and the other shut, this would not be possible, these conditions being so seldom practised that the help of the second eye is not readily realised. All defects of focusing militate against accurate shooting, but they can be corrected by appropriate glasses for shooting, but herein lies a great danger, especially in long sight and astigmatism. In the case of long sight, directly the firer gets nervous or excited, there is a great liability to spasm of the focusing muscle. Astigmatism, too, is extremely likely to provoke such spasm of accommodation, which in its turn may produce heterophoria. Long sight, again, is liable to lead to all sorts of trouble, because it is seldom suspected, the sight being unaffected in low degrees. The sort of catastrophe that may suggest long-sightedness and spasm of accommodation is in shooting, for instance, in a series of seven shots, when the firer is liable to get five bulls or high scores for the first five shots and misses the last two. Of course, although the writer advocates the keeping of both eyes open and the consequent use in rifle shooting of both eyes, he is quite prepared to admit that it is difficult to acquire, as it entails confusion and seeing two barrels instead of one, which may necessitate the closure of the eye for a moment to find out which are the true sights to be aligned, but after a time, a knowledge of this is readily acquired. In selecting men for the Army, sufficient attention is not given to long sight in proportion to the attention which is lavished on short sight, for there is much greater danger to a soldier in the error which he does not recognise than in the error of which he is aware. Everyone can observe how much a short-sighted person makes out, even at a greater distance than that at which he can see clearly. Comparing, for example, short sight with long sight, the mischief of long sight is in people under 40 very often only manifest after exhausting conditions, such as a night out in the trenches without food, which would not affect in a special degree a short-sighted man, but might render quite hopeless a long-sighted man who, under normal conditions, is a really good shot. The writer believes that, so far from being encouraged to keep both eyes open in shooting, the soldier is actually taught to shut one, and, in his opinion, the greatest advance that can be made in preparing the soldier for warfare is the recognition of the principle above-mentioned.

One word on the requirements for big gun shooting, especially naval firing. The man whose duty lies here should be specially selected as having a short latent period. By "latent period" is meant the time it takes for a visual impression to reach the brain for its consideration and the length of time required to send a motor impulse down to the fingers to press the trigger or pull the lanyard. For instance, a man with a long latent period would have to pull the lanyard much sooner as the sights of the gun come on the mark when the ship is rolling than one whose latent period is short. In fact, the latent period is a detail of some importance which is not sufficiently regarded in selecting gunners. The latent period varies, too, under different conditions. It is lengthened by alcohol or muscular exhaustion, and shortened by tea or coffee, and it can be easily understood that its influence is continually altered.

Fishing.

Of course, in fishing, the importance of recognising the character of the water that is going to be fished, and the place where the catch is most likely to be made, is considerable. These are seen with the eyes, but perceived by knowledge and experience of the habits and ways of fish. The frothy backwater of the rushing stream, beneath the rocky bank or just under the rocks, where experience knows the wily trout will be lying, are places which would not be chosen by an inexperienced fisher unless they were pointed out to him. All this is easily recognised without being further indicated. But, to be able to throw a fly many yards off, exactly on the spot desired, even under adverse conditions of wind and stream, needs peculiar judgment of "Eye." The fisher fixes his eye on the spot on which he wishes to cast his fly, and with the movements of the arms and hand he is able to give the impulse to yards of line, in order to land the fly almost on the exact spot he has selected. On consideration, this is one of the most marvellous co-ordinations of hand and eye, because it means such intimate knowledge of the swing of the rod and the impulse which it is capable of giving. People often talk of striking the fish; of course, this may be all very well with sluggish fish and eels, which swallow and suck the bait, but in trout fishing a trout is never really hooked except accidentally in this way, but, like salmon, he hooks himself, and the so-called striking is merely taking up the slack of the line, in order that he may not repudiate the hook. In playing a salmon a good deal of "Eye" is required, in order to make the rod give when the salmon jumps, in keeping a taut line, which is so important in making sure of the fish. The question of the "Eye" of the fish would be an interesting point to consider, but hardly comes within the scope of this article. What the fish can see in the way of colour, and what he thinks of the bait which is offered him in the way of flies, are interesting questions. The views of a salmon on what is presented to him at the end of a line would be especially interesting. Certainly, he is capricious enough, whatever may be his views.

[THE END.]

CLINICAL MEMORANDA.

A CASE OF GLASSBLOWERS' CATARACT IN A "PUDDLER" (IRONWORKER).

BY

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AT the Ophthalmological Section of the XVIIth International Congress of Medicine, held in London (1913), I had the opportunity, during the discussion upon the "Affections of the Eye produced by undue exposure to Light," of pointing out that the type of cataract known as "Glassblowers' Cataract" and generally supposed to be confined to that trade, was to be found occasionally amongst workers in the iron trade, notably amongst those called "puddlers."

At the time, I was unable to give details of the cases which I had seen, but based my observations on the memory of four or five such that had presented themselves at the Wolverhampton Eye Infirmary in the past few years. Unfortunately, I have been unable to trace these cases for various reasons.

I can now, however, bring forward details of a case of typical "Glassblowers' Cataract" which has occurred in a man who for thirty years has followed no trade other than that of a "puddler."

The occupation of a "puddler" is one, which, for a considerable time during the day, involves the exposure of the eyes to a combination of intense light and heat. He has to look, almost continuously, at molten iron through a small rectangular opening, during a period of from one to two hours. The period is called a "heat," and there are six or seven "heats" in a day with, as a rule, a half-hour interval between each.

Practically, none of the men wear protective goggles of any kind, so that the full force of the light and heat falls directly upon the eyes.

Case.

M.F., aged 50 years, for thirty years a "puddler," presented himself at the Wolverhampton Eye Infirmary on January 18th, 1915, complaining that his vision had steadily diminished for a year, especially during the past month. There was no history of previous ocular trouble, and no family history of cataract.

The man himself is healthy, but looks older than his years.

On examination of the eyes, the lids and conjunctivæ present the weather-worn appearance of those of a man engaged in a dusty trade. Both corneæ are clear, the anterior chambers normal in depth, the irides sound and the pupils react well. Through the undilated pupils (rather small) the lenses appear greyish-white, as though mature senile cataracts were present in each eye, but on dilatation with homatropine and cocaine, both are seen to present the type known as "Glassblowers' Cataract." The right lens shows a moderately dense posterior polar and cortical opacity, surrounded by a less dense area with a well-marked irregularly-circular outline. The periphery of the lens shows some dot opacities with several striæ downwards and inwards and a few scattered smudges elsewhere. A moderately clear view of the vitreous and fundus is obtainable; they appear normal. The left lens, as compared with the right, shows a much denser posterior polar and cortical opacity, surrounded by a less dense area with a well-marked circular outline, the extent of which, however, is less than that of the right lens. Some striæ and dots are to be seen in the comparatively clear periphery. The vitreous is clear and fundus normal. The vision of each eye with the undilated pupil has been reduced to ability to count fingers at two feet, but is distinctly improved by dilatation.*

Remarks.

Such cases are by no means common, for besides the above, I am unable to recall more than four or five others in the past ten years.

If it be true in the case of glassblowers that this type of cataract is directly due to the occupation, and there is no reason to doubt it, it should equally be held that in the case of a "puddler" developing the type, the occupation is responsible, for the working conditions are so similar.

The "puddler," then, becomes entitled to the same compensation (all too small) that the glassblower, so afflicted, enjoys under the Workmen's Compensation Act.

The addition of the "puddler" to the glassblower in the Industrial Disease Schedule would mean a small matter to the employers, for the number of cases is small, but to the individual concerned it would mean the difference between pauperism and ability to hold on until a successful operation restores useful sight to him and enables him to do some work.

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* Patient shown on February 3rd, 1915, before the Royal Society of Medicine, Section of Ophthalmology.

In the event of it being generally accepted that this type of cataract can occur in trades other than that of the glassblower (in America this is already so), a more scientific term might be adopted to distinguish the characteristic posterior polar opacity which follows the prolonged exposure of the naked eye to intense light and heat.

The term "light cataract" or "heat cataract" would indicate that light rays alone, or heat rays alone, were the ætiological factor, but as this has not, as far as I know, at present been decided, I suggest the term "ray cataract," as being an inclusive one and indicating that the ætiological factor was the action of heat or light rays, or of both, as the case may be.

RESULTS OF EXAMINATION OF FIVE HUNDRED CONSECUTIVE CASES WITH STILLING'S PLATES.

BY

GEORGE HENRY TAYLOR,

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Of the 500 examined,

415 (83·0 per cent.) were correct in all plates.
31 (6·2 per cent.) were partially wrong in 9, but were correct in other plates.
3 (·6 per cent.) failed only in 9.
11 (2·2 ,,) were partially wrong in 6 and 9 only.
2 (·4 ,,) ,, ,, ,, 6 only.
2 (·4 ,,) ,, ,, ,, 5, 6, 7, 8, 9 only.
1 (·2 ,,) was ,, ,, 7, 8, 9, only.
1 (·2 ,,) ,, ,, ,, 7 and 9 only.
1 (·2 ,,) ,, ,, ,, 6 and 8 only.
1 (·2 ,,) ,, ,, ,, 2 only.
1 (·2 ,,) ,, ,, ,, 7 only.
1 (·2 ,, ,, ,, ,, 10 only.
1 (·2 ,,) ,, ,, ,, 8 only.
1 (·2 ,,) ,, ,, ,, 7 and 8 only.
1 (·2 ,,) ,, ,, ,, 6, 8, 9 only.
1 (·2 ,,) ,, ,, ,, 2, 4, 5, 6, 7, 8 only.

Twenty-six (5·2 per cent) failed in one or more plates (excepting 9) classified as follows:—

12 (2·5 per cent.) were red-blinds, failing in Holmgren's wools and Williams' lantern.
3 (·6 per cent.) were incomplete colour blinds, failing in Holmgren's wool and Williams' lantern.
2 (·4 per cent.) had feeble colour sense, failing in Holmgren's wools and Williams' lantern.
9 (1·8 per cent.) failed only in lantern test.

Of the 12 red-blinds,

2 failed in plates 2, 4, 5, 7, 8, and partially in 6.
2 ,, ,, 2, 4, 5, 6, 7, 8, ,, ,, 1 and 9.
1 ,, ,, 4, 5, 6, 7, 8, ,, ,, 1 and 2.
1 ,, ,, 1, 2, 4, 5, 6, 7, 8,

1 failed in plates 2, 4, 5, 6, 7, 8, and partially in 3 and 9.
1 ,, ,, 2, 5, 6, 7, 8, ,, ,, 1, 4, 9.
1 ,, ,, 2, 4, 5, 6, 7, 8, ,, ,, 1.
1 ,, ,, 2, 4, 6, 7, 8, ,, ,, 5.
1 ,, ,, 1, 2, 4, 5, 6, 7, 8, ,, ,, 9.
1 ,, ,, 2, 4, 5, 7, 8, ,, ,, 6.

Of the 3 incomplete colour blinds,
1 failed in plates 2, 4, 5, 7, 8, and partially in 1, 6, 9.
1 ,, ,, 2, 4, 5, 6, 7, 8, 9, ,, ,, 1.
1 ,, ,, 2, 4, 5, 6, 7, 8, ,, ,, 3.

Of the 2 who had feeble colour sense by wools and failed lantern,
1 failed in plates 2, 4, 5, 6, 7, 8, and partially in 1 and 9.
1 ,, ,, 4, 5, 6, 7, 8, ,, ,, 1, 2, 9.

Of the 9 failing in the lantern test,
1 failed in plates 2, 4, 5, 7, 8, and partially in 6.
1 ,, ,, 2, 4, 5, 6, 7, 8 ,, ,, 1 and 9.
1 ,, ,, 5, 6, 7, 8 ,, ,, 1, 2, 4.
1 ,, ,, 5, 6, 7, 8 ,, ,, 4 and 9.
1 ,, ,, 2, 4, 5, 6, 7, 8, 9 ,, ,, 1.
1 ,, ,, 4, 5, 6, 7, 8 ,, ,, 2 and 9.
1 ,, ,, 2, 4, 5, 6, 7, 8 ,, ,, 3.
1 ,, ,, 7, 8 ,, ,, 1, 2, 4, 5, 6, 9.
1 ,, ,, 8, 9,

Of the 415 who were correct in all plates,
369 were normal by wools and lantern.
1 was red-blind by wools and failed in lantern calling G.—W.
2 had feeble colour sense by wools and failed in lantern calling G.—W.
5 failed in lantern only, 4 calling G.—W., and 1 G.—W. and W.—R.
12 were doubtful in wool test, but were correct in lantern.
25 were normal in wools, called G.—W. in lantern, but were subsequently correct.
1 was doubtful in wool test, called G.—W. in lantern, but was subsequently correct.

Of the 31 who were partially wrong in 9 only,
25 were correct in wools and lantern.
2 were doubtful in wools, but correct in lantern.
4 were correct in wools, but called G.—W. in lantern and were afterwards correct.

Of the 3 who failed only in 9:
2 were normal in wools and lantern.
1 was normal by wools, called G—W in lantern, but was afterwards correct.

Of the 25 who were partially wrong in plates other than 9:
21 were normal by wools and lantern.
1 who failed partially in 6, 9, was normal by wools, called G—W in lantern, but was afterwards correct.
1 who failed partially in 5, 6, 7, 8, 9, was normal by wools, called G—W in lantern, but was afterwards correct.
1 who failed partially in 2, was doubtful in wools, but lantern correct.
1 who failed partially in 5, 6, 7, 8, 9, was doubtful in wools, but lantern correct.

No cases occurred of failure in any of the plates, excluding 9 in which the defect was not disclosed, either by the wools and lantern or lantern alone.

There were 3 cases of failure by both wools and lantern, and 5 cases of failure in lantern only, making a total of 8 in which the whole of the plates were read correctly.

The following is a summary of the 500 cases, eliminating partial failures and failures only in 9 in Stilling's plates and doubtful cases in wools and those who called G—W in lantern, but were afterwards correct :—

Cases.	Stilling's plates.	Holmgren's wools.	Williams' lantern.
466	+	+	+
17	—	—	—
9	—	+	—
3	+	—	—
5	+	+	—
500			

The rejections in accordance with the regulation tests were :—

Red blind	13	2.6%
Incomplete	3	0.6%
Feeble C.S.	4	0.8%
Lantern only	14	2.8%
Total	34	6.8%

Colour Testing.

I used the 14th edition of Stilling's plates in the examination of these candidates, examined each man separately, and commenced my examination with the groups 11 and 12, which are not a test for colour defect. If a candidate confused a 3 with an 8, and a number of candidates did so, I explained to him his mistake. In nearly every case he named the other numbers correctly and promptly. The numbers in group 3 are identical with the numbers in group 11, and the numbers in group 9 with group 12.

A candidate with a normal colour sense will promptly and correctly name the numbers in groups 1, 2, 3, 4, and 5, excepting that he may still occasionally confuse a 3 with an 8. Such a candidate may hesitate a little in naming the numbers in groups 7 and 8 and may misname one of them, but, as Stilling anticipates in his preface, ultimately he is correct. He may be a little confused with the numbers in group 6 because of the, to him, unexpected difference in the size of the numbers and their position in the plates, but he is finally able to name the numbers correctly. Such a person, however, is slow and uncertain in naming the numbers in group 9. In this group he frequently makes several mistakes, and may be unable within a reasonable time to name the numbers correctly. A red-green-blind by the lantern can frequently read correctly and occasionally promptly group 1. He is rarely able to read No. 2 correctly and never promptly, and generally cannot see any number. He occasionally is partly correct. The numbers in group 3 are of little practical value. A person who is completely blind to them is very rare. About 1 in 200 is partly blind to them, and may at first state that he cannot see a number, but ultimately he names one or more of them ; if he fails he always does so in the number 4. Such a person will read the 4 in 11 and 12 correctly and promptly. A person who fails completely or incompletely in 3 can read 1 and 10, but fails in 2, 4, 5, 6, 7 and 8. He may fail in 9, but usually is more prompt and correct than is a person with a normal colour sense. In 4 and 5 he is nearly always unable to see any number, even when his attention is forced. He is always unable to name the numbers in group 7, but men who are normal in the lantern, in the wools and by the anomaloscope and who can read with occasional slips the numbers in 1, 2, 3, 4 and 5, may have great difficulty in seeing the numbers in group 7, but when their attention is forced are ultimately able to do so.

A person with a normal colour sense is always able to name correctly the numbers in group 8, although he may do so with some hesitation.

If a person can name correctly the numbers in group 9 with only slight hesitation, and has a difficulty in reading the numbers in the preceding plates, he is colour defective.

A person who can name all the numbers in Stilling correctly and promptly has not only (with rare exception) a normal colour sense, but has also a mental factor which enables him quickly and correctly to define what he can see. Such a person is very uncommon.

I have seen only one candidate who partly failed in group 10. He had great difficulty in naming the numbers in it (although he promptly named the numbers in groups 11, 12, and 3), and failed to name all of them correctly. He was a red-green-blind by the lantern, red-blind by the wools, and failed in groups 2, 4, 5, 6, 7, and 8, He was partly correct in 9.

A number of candidates who fail in Stilling are only detected by the lantern as green-white men. The evidence gives me the opinion that although red-green-blind, the appeal of the coloured lights in the lantern enables him through shade and the surrounding contrast of dark to name correctly what he sees.

When a man is markedly defective in No. 9, when he cannot after many attempts name the number in that group correctly, and when he also shows a defective sense of green by the lantern, although he may not be classified from the evidence as a colour blind, has a mind so defective in its ability to define what an ordinary man can define, that I think he should be rejected without the right of appeal.

About 15 per cent. of men in a first answer confuse pale green with white when it is in contrast with a fuller green, and do not repeat the mistake. Such cases are frequently normal by Stilling, the wools and the anomaloscope, Such cases, in my experience, are rarely prompt in naming correctly the groups 6, 7, 8, and 9. A person who cannot be taught in one sitting to correct his error, with few exceptions fails in Stilling, and may do so as markedly as a man who is a red-green-blind by the lantern. A man who partly fails in 3 may be detected by the lantern as only a green-white failure.

I recently examined a signalman who had been in that position for several years, an intelligent healthy man, of stable type, with an excellent record. He named the pale green and white when in contrast as two whites repeatedly and with Stilling failed completely in 2, 3, 4, 5, 6, 7, and 8, was normal in 1 and 10, and prompt and correct in 9,

An engine driver of a similar type, a few years ago when driving a mail train passed the home signal at danger and ran into a train in a loop line. He swore with earnestness that the signal light was green. He called the white—green and the pale green—white; failed in 2, 4, 5, 6, 7, 8, partly in 3, and was prompt and correct in 9.

My experience leaves me with no doubt about the excellence of Stilling's plates as a test for colour vision. In my opinion, they should replace Holmgren's wools in the railways and be used in conjunction with the modified Williams' lantern.

THE OCULAR MANIFESTATIONS OF INFANTILE SCURVY.

BY

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Prefatory.

ONE may look in vain through the indices of some of the modern text-books of ophthalmology without coming across any reference to the ocular manifestations of infantile scurvy or "scurvy-rickets," as it used to be called not so very long ago.

The commonest sign is in reality a dual one, consisting of (a) protrusion of the eyeball, and (b) hæmorrhage beneath the skin of the eyelids or neighbouring parts. It is true that the two elements may occur independently of one another, but in most cases they are conjoined. To judge from the 379 cases of infantile scurvy collected and analysed by the American Pediatric Society in 1898, the sign cannot be called exactly a common one, since it was found in about 10 per cent. of the cases only.[1] In 9 of the 49 cases swelling of the lids was present; in 18 proptosis; and in 22 both signs were noted. Blood-staining of the eyelids was present in 11 per cent. of the 54 personal cases of infantile scurvy brought together by G. F. Still some years ago,[2] and in 5 out of the 6 cases was associated with protrusion of the eye. Heubner[3] reported orbital hæmorrhage four times amongst 65 cases, or 6·15 per cent. On the other hand, Nicolay (quoted by F. Schlesinger[4]) found orbital hæmatoma in 49 of 372 patients, or no less than 13·17 per cent.

The proptosis may range from so slight a change that it has to be looked for carefully in order to be identified, to one that strikes the observer in a moment. It must, however, be rare indeed for it to attain such dimensions as to lead to loss of the eyeball from exposure and sepsis of the cornea, as in a case mentioned to me by Dr. G. A. Sutherland, of London.*

Similarly, the effusion of blood may be represented merely by a line or patch of blood-stain in the eyelids (usually the upper lid) or in the close vicinity of the orbit, to a large protrusion of the eyelid by blood, as in the case to be described presently. These cutaneous or subcutaneous hæmorrhages are usually due to an effusion of blood between the periorbita, on the one hand, and the bones of the orbit, on the other, and that accounts for the frequent co-existence with proptosis, owing to the same cause. It was shown by Sir Thomas Barlow in his famous communication "On cases described as Acute Rickets," read before the Royal Medical and Chirurgical Society in 1883[5] that the painful bone manifestations that usually form so prominent and early a feature of infantile scurvy were due to the sub-periosteal effusion of blood. That a similar explanation applies to the eye changes is shown by Snow's case,[6] in which the blood lay between the periorbita and the bone and filled almost the entire orbital cavity. Other symptoms of scurvy were well marked.

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*Nicolay's case, mentioned by K. Steindorff,[8] probably belonged to this class. The cornea of a baby suffering from Barlow's disease became insensitive (?pressure) and was scratched by a nail. The result was hypopyon-keratitis.

It has been noted by more than one writer that proptosis and ecchymosis may occur with great suddenness, usually after a fit of crying.

There are a few other hæmorrhagic manifestations of infantile scurvy that should be enumerated.

The first mention of subconjunctival hæmorrhage that the writer has been able to find was in cases by Shoppee and R. J. Godlee respectively, the details of which were published in 1883 by Sir Thomas Barlow (*loco citato*[5]). Since then the occurrence has been noted by many authors.

Hirschberg[7] has related an otherwise typical instance of scorbutus in an infant of nine months, where as the signs of a large orbital hæmorrhage were subsiding, flame-shaped hæmorrhages were found in the retina, to say nothing of subconjunctival hæmorrhages.

Lastly, blood in the anterior chamber of the eye has been seen by Otto Katz[8], of Charlottenburg.

The recognition of the cause of the various conditions spoken of above is, as a rule, simple enough. An infant who screamed almost the moment the doctor entered the room, whose lower limbs could scarcely be touched without agony to all concerned, whose gums were spongy, bleeding, and of evil odour, and who likewise presented a livid or swollen eye, could only be affected with infantile scurvy. A difficulty might arise when, as in the case to be described immediately, the ocular antedated all other signs of scorbutus. Even then, in order to avoid error, we have but to recall the familiar caution, namely, that a black or protruding eye during the first dentition, not due to injury, is much more likely to be caused by scurvy than by anything else.

Case.

Kate S., aged 5 months, was brought to the Eye Department of the Queen's Hospital for Children, London, on January 7th, 1915.

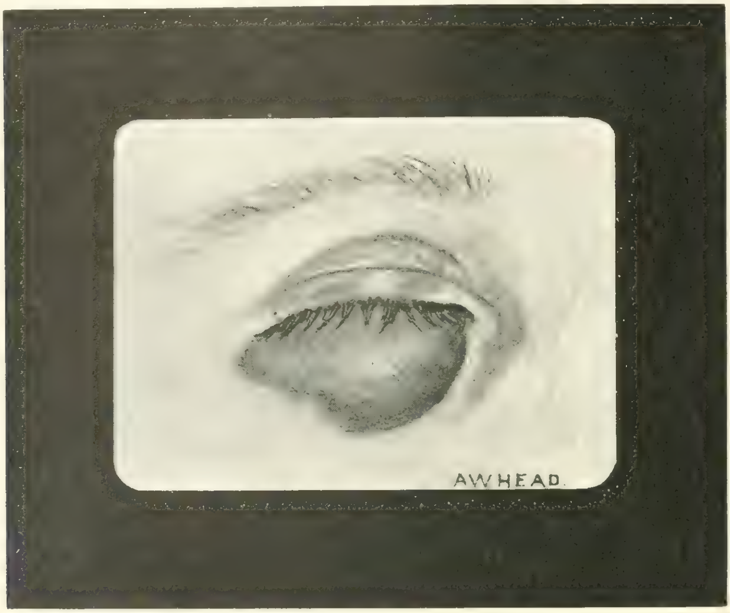
The history of the case was to the effect that the infant did well until the middle of last December, when she developed "thrush," diarrhœa, and vomiting, symptoms from which she made a fair recovery in the course of about a fortnight. On January 3rd a small black spot or line was noticed in the skin of the right lower eyelid. There had been no injury to the parts. No especial importance was attached to the mark. But on the following morning the eyelid was much swollen and discoloured, and since then no particular change has been noticed in the condition of the parts. On January 6th, the day before the infant attended the hospital, the medical practitioner, under whom the patient had been, made a puncture into the distended lower lid, with the escape of what was described as "blood and matter."

As to diet, during the first two months of life, the baby was on the breast, and after that Nestlé's milk was given exclusively. Since recovery from the attack of December last nothing has been given in the way of food except albumen water. No patent foods have been used in bringing up the infant.

On admission, the right eye was completely closed by the pressure of the lower lid, which was enormously distended with blood. The swollen parts were almost chocolate-brown in colour. A recent puncture, exuding a little blood, was present at about the junction of the outer third with the inner two-thirds of the lower lid. The upper eyelid was not swollen, and exhibited merely a few insignificant patches of cutaneous ecchymosis. The eyeball was not protruded. The cornea was clear. Temperature, 99° F. The child had some colour in her cheeks, and although somewhat wasted (weight, 11 lb. 6 oz.), yet looked tolerably well. No tenderness on handling. No swellings about legs or arms. There were no teeth, and the gums were in excellent condition. Some craniotabes was present. No obvious signs of rickets.

A provisional diagnosis of infantile scurvy was made, and the child admitted as an in-patient. She was placed on equal parts of "raw" milk and water. One teaspoonful of raw meat juice was given every three hours, alternatively with a similar quantity of orange juice. The affected eyelid was treated with compresses of hydrogen peroxide.

The improvement in the state of the eyelid was striking. Already when the picture was made (see figure), two days after admission, the condition was less marked, and the puncture mentioned above was healed. A couple of days later the baby could open the eye somewhat, and seven days after admission the eye could be widely opened, and the lower lid, although blood-stained like a "black-eye," was not swollen. In fact, in the course of a single week under anti-scorbutic diet, improvement had taken place that in ordinary cases would probably have been spread over three weeks or a month.



The infant's general health, unfortunately, did not improve *pari passu* with the local condition. It is true that during the week's stay in hospital the child gained 3 oz. in weight. But on January 8th, the day after admission, the pulse was 172 per minute, and the temperature 102·8° F. Since then the temperature has not fallen below 101·4° F., and has generally been between 103° F. and 104° F., without any definite cause having yet been found to account for it. The stools, which have numbered from three to seven a day, were found to contain blood on January 12th and 13th. On January 14th the urine, although clear, showed, when tested, a trace of blood.

On the evening of January 14th an area of consolidation was found at the base of right lung. Serous fluid withdrawn by a needle from the affected part was found to be sterile. On January 16th signs of meningitis developed, and the baby died on January 18th.

The notes of the *post-mortem* examination are appended :—

External appearance.—Body wasted. The right lower eyelid, not now swollen, presents a thin line of ecchymosis. *Pharynx*, *larynx*, and *pleuræ*, normal. *Lungs.*—Consolidation of parts of both bases, more extensive on the right than the left side. *Bronchial glands.*—Enlarged. *Thymus.*—Not enlarged. *Pericardium.*—No signs of pericarditis, but slight excess of clear fluid. *Heart.*—Weight 1 ounce. Normal. *Abdomen.*—Liver, weight 1 lb., large, pale, and fatty. No free fluid in peritoneal cavity. *Intestines.*—One or two slightly inflamed patches on mucous membrane of small intestine. No hæmorrhages anywhere. *Spleen.*—Soft, weight $\frac{1}{2}$ ounce. *Stomach.*—Normal, no hæmorrhages. *Kidneys.*—No congestion. Normal. Weight $1\frac{1}{2}$ ounces each. *Brain.*—Whole surface of vertex and base covered with greenish-yellow pus, most marked over both frontal lobes. Excess of turbid fluid at the base of the brain. Convolutions flattened. Films show pneumococci. *Miscellaneous.*—Parietal and frontal bones very thin and transparent. No other abnormality noticed about the osseous tissues. No evidence of rickets or of congenital syphilis.

Comments.

The foregoing can only be regarded as an instance of infantile scurvy, with uncommon ocular manifestations. Apart from the difficulty of accounting for a non-traumatic hæmatoma in so young a child on any other view, there is evidence in support of the suggestion: (1) the extraordinarily rapid subsidence of the effused blood under the influence of an anti-scorbutic diet, and (2) the discovery of blood in (a) the stools and (b) the urine. On the other hand, the classic signs of infantile scurvy were conspicuous by their absence.

The case is further peculiar in that the ocular manifestations preceded any other signs of scorbutus. That such an event is rare is shown by the figures of the American Pediatric Society[1], already quoted, dealing with 379 cases of infantile scurvy, in not one of which were the ocular symptoms amongst those first seen. In my own case, melæna did not develop until nine days, and blood in the urine until eleven days, after the hæmorrhage into the eyelid.

From some points of view the case is reminiscent of one reported by W. T. Holmes Spicer[9] in an infant of seven months, brought because the right upper eyelid was tensely swollen and blood-stained. There were no other evidences of infantile scurvy. Rapid improvement took place once the infant was placed on suitable diet, together with cod-liver oil. A more typical case was narrated by E. Schlesinger[4] in a boy, aged eight months, in whom bleeding into the orbit and proptosis preceded the development of all other signs of Barlow's disease.

As regards the lesion of the eyelid, a case analogous with my own has been placed on record by K. Steindorff[8] in a child, aged seven months, whose left upper eyelid was greatly distended by blood and consequently of a bluish-red colour. Slight lesions of the gums were present. The child's body was exquisitely tender when touched. Traces of blood were found in the otherwise clear urine. One small conjunctival ecchymosis was present, but there were no retinal changes. The child made a good recovery.

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8. **Steindorff, K.**—*Zeitschrift f. Augenheilkunde*, 1911, Bd. XXV, S. 180.
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CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—DEVELOPMENT OF THE VISUAL CENTRE.

Lenz, G.—Upon the development of the visual centre. (Zur Entwicklung der Sehsphäre.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1913, p. 42.

Lenz, of Breslau, had succeeded in bringing up rabbits from birth in a box which was completely opaque except for a pane of spectral blue glass. At the end of thirteen months, two of them were killed and serial sections made from the brain, which had been hardened in 96 per cent. alcohol. The visual centre of the rabbits, according to Munk and others, is situated upon the dorsal surface of the occipital lobe, where it occupies a considerable area. In this region Lenz found a very striking rarefaction of the ganglion cells in the pyramidal layer. Instead of being sharply defined, as they were in the sections taken from the brains of similar but normal rabbits of the same age, they had a diffused appearance. These changes were more marked in the deeper parts of the pyramidal layer where the small cells of the granular layer, which are usually somewhat veiled by the base of the pyramidal layer, appear very much more distinctly than usual as isolated streaks. This is well shown in the micro-photographs upon the plate which accompanies the paper.

The only deduction Lenz draws from the experiment is that modifications in the visual centre can be produced by slight variation in the optical stimulus during the growth of the animal. It was found difficult to rear rabbits and dogs in red light, but some were successfully reared up to the fourth month. There is no account of the influence of red light upon the brains in question.

T. HARRISON BUTLER.

II.—NOURISHMENT OF THE EYE.

Hamburger.—Contributions referring to the nourishment of the eye. (Beiträge zur Ernährung des Auges.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1913, p. 119.

Hamburger, of Berlin, replaced the contents of the anterior chamber of a rabbit by a 1 to 2 per cent. solution of neutral red. After about an hour, the eye was enucleated and the lens carefully removed. The pupillary area of the lens showed a circular area stained scarlet; the remainder was not coloured. The same experiment was made after iridectomy, and again the scarlet area exactly corresponded to the enlarged pupil. This result confirms Hamburger's long-held view, that there is a watertight valvular obstruction between the anterior and posterior chamber. We do not know how often or how seldom this valve opens. The appearance of the two lenses is portrayed upon the coloured plate which accompanies the communication.

The author has discovered a new method for inducing glaucoma, which, he says, often fails. A concentrated filtered solution of nigrosin is injected under high pressure into the previously emptied anterior chamber of a rabbit until the black solution fills the episcleral vessels. The canula remains *in situ* for an hour, and is then removed, together with the dye. During the next few days a more or less active glaucoma develops, which may augment until the globe bursts without the previous formation of ulcers. Pictures of eyes so treated appear on the plate.

Another illustration shows a section of a normal rabbit's eye, in which Descemet's membrane is stained a delicate blue. This effect was produced by injecting sodium indigo sulphate into the auricular vein. Fifteen minutes later, the eye was enucleated, fixed in absolute alcohol, embedded, and cut. We have here a marked example of elective vital staining. The indigo must have been secreted from the iris, because the ciliary body works too slowly to have been responsible.

The last illustration upon the plate is concerned with the interesting fundamental question whether the effect of iridectomy and operations which take its place depend upon the increased permeability of the scar. The author showed to the Congress in 1912 preparations taken from eyes whose anterior chambers had been forcibly injected with the indigo salt already mentioned. The cicatrix was seen to be the least stained part of the eye. It was objected that the iris had healed in the wound and mechanically stopped the outflow of the stain. The present preparation was made from an eye in which the iridectomy was made in the middle of the cornea. The scar is the least stained part of the cornea.

Hamburger referred to Hiere's use of fluorescein in the differential diagnosis between glaucoma and iritis. When this is administered by the mouth, it fails to pass the normal human ciliary body, although it passes easily in the case of animals. An inflamed ciliary body permits the fluorescein to pass when it appears in the anterior chamber.

Discussion.

Gutmann, of Berlin, told the Congress that he had succeeded in making the test by injecting fluorescein subconjunctivally. The drug appears in the anterior chamber in the presence of iritis, but otherwise it is not seen. This method obviates the objectionable bronzing of the skin which occurs after the ingestion of fluorescein.

T. HARRISON BUTLER.

III.—INDIRECT VISION.

Calderaro.—A contribution to the study of indirect vision (Contributo allo studio della visione indiretta.) *La Clinica Oculistica*, Ottobre, Novembre, Dicembre, 1913.

Many previous investigators have attacked the problem of the measurement of indirect vision, but so far there has been evolved no method so simple and exact as to commend itself to clinical workers, and in practice, the sole measurement of the peripheral acuity of vision has hitherto been the examination of the extension of the visual field, and, in some cases, the examination of the intermediate zone for scotomata.

Calderaro gives a short review of the work of previous investigators, and calls attention to the multiplicity of their methods, and especially of their test objects.

As a result of his personal experiments, he concludes that a white object on a black ground serves better to determine the condition of the luminous sense and the acuity of the peripheral retina than a black object on a white ground, and he prefers two black squares on a white ground to determine the sense of form. Letters and similar test objects are not well adapted to the researches, because the sense of form is very feebly developed in the peripheral retina. For the examination of the colour sense, he makes use of coloured squares on a black ground.

The examination of the peripheral retina should be conducted in daylight, if possible. Objects are more readily perceived when they are moved slightly in a sense tangential to the luminous ray which strikes the eye under examination. It is well known that a movement of any object appears greater in the peripheral than in the central field. On the other hand, a constant stimulus very soon exhausts the peripheral retina.

Calderaro has noted a very curious fact concerning indirect vision, *viz.*, that two test objects which at different distances subtend the same angle, do not represent the same acuity of vision in the examination of the peripheral retina; thus, if two squares, having a side of 2 mm. and a distance separating them of 2 mm. are seen separate at a distance of 50 cm. on an oblique axis 30° external to the fixation point, it does not follow that two similar squares having sides 4 mm. will be seen in the same axis at a distance of 100 cm.; probably they will have to be brought to within 80 cm.

Of the two methods of examination hitherto in use, the circular at fixed distance (as in the ordinary perimeter), and the radial at varying distances, Calderaro has selected the latter on account of the facts just mentioned. He makes the examinee sit at an ordinary perimeter, with his head inclined 30° inwards and 10° upwards to avoid the prominences of the nose and eyebrows, and with his back to a north window.

He "fixes" during the examination a letter of Snellen's test type (Sn. 5.0) stuck on the wall at a distance of 5 m. The surface of the wall is uniformly blackened. The eye not under examination is closed with a bandage.

From a spot on the floor corresponding to the position of the eye against the rest of the perimeter are drawn lines which radiate thence in a fan showing every 10°. On each radius are drawn lines marking every 20 cm. Along these radii an assistant moves carrying the test object, and notes at what distance it is recognised by the examinee. In this way he measures for each radius the maximum distance at which the object is seen.

Calderaro gives a tabulated scheme of the results obtained by the examination of ten normal eyes for colour and luminous sense, and also for form (which is the least developed of all the functions of the peripheral retina).

The results given by certain pathological eyes are also recorded. Calderaro comes to the following conclusions:—

"1. The test objects best suited to examination of the indirect vision are: (i) for the light sense, a square of white 2 mm. inside, on a black ground; for the colour sense, squares of the same size, of blue, red, and green; (ii) for the form sense, two squares of black (side 5 mm.), on a white ground, separated by a space of 5 mm.

"2. The best method of examination is by means of an object of fixed size and varying distances, not as in ordinary perimetry, at a fixed distance with varying size. The object should be moved centripetally on successive radii towards the eye.

"3. To get accurate measurements, repeated testing is necessary, but with this, accurate results can be obtained even in patients of limited intelligence.

"4. The point fixed ought to be at least 5 m. away to relax all accommodation.

"5. The light sense has the most extended limits in indirect vision, then comes the sense of form, then the limits of blue, of red, and of green in that order. The fields of red and green are very similar in size and shape, and often run together.

"6. These limits in the horizontal plane, describe an elongated trapezoidal space which extends a little further on the temporal side.

"7. The relation between the central and peripheral vision varies for the various sensations. The decrease is least rapid for blue, more rapid for white, red, form sense, and lastly most rapid for green.

"8. The influence of accommodation is to reduce the acuity sensibly in the paracentral regions up to 30°, and to increase it very slightly in the periphery.

"9. The limits of indirect vision of hypermetropes are identical with those of emmetropes, but the limits of myopes are distinctly less.

"10. The measurements of the peripheral vision may give valuable assistance in the diagnosis and prognosis in doubtful cases of nerve lesion. The alterations of the indirect vision are more early than alterations of the central acuity or of the field taken by the perimeter."

HAROLD GRIMSDALE.

IV.—INTRA-OCULAR TENSION.

(1) **Kuemmell, R.—Increased intra-ocular tension, due to burns and corrosive injuries of the eye.** *Archives of Ophthalmology*, Vol. XLIII, No. 1.

(2) **Lederer, Rudolph.—Intraocular tension, passive and in active motion of the eyeball.** *Archives of Ophthalmology*, Vol. XLIII, No. 1.

(3) **Casolino, L.—Behaviour of the ocular pressure under the influence of drugs which modify the arterial pressure.** *Archivio di Ottalmologia*, 21st year, p. 588.

(4) **Guglianetti, L.—Behaviour of the tension of the eyeball at high altitudes.** *Archivio di Ottalmologia*, 21st year, p. 382.

(1) **Kuemmell**, of Erlangen, draws attention to the regularity with which an increase of tension is met with in eyes which have been injured by burns, or by the chemical action of strong acids or alkalies. The condition commences four or five days after the injury, lasts a week or more, and may require the use of myotics for its relief. The chamber is deeper than normal, and often irregularly so; with this sign is associated an agglutination of the tissues at the angle. Kuemmell considers that the increase of tension and the deepening of the chamber are both due to the obstruction to outflow, caused by the closure of the irido-corneal angle; he suggests that the increased albumen content of the aqueous may be a contributory factor. He points out that a similar type of high tension attack is met with, whether the burn is due to the action of chemical reagents or to ordinary burns, such as those seen amongst the slag-burners, provided only that the limbus is affected. R. H. ELLIOT.

(2) **Lederer**, of Wuerzburg, has used a specially arranged manometric device to test the influence of active ocular movements on the tension of the globe. He worked on the eyes of a rabbit, a monkey, and a man (the latter in an eye about to be enucleated for new growth of the conjunctiva), and found that "the graphic curve registered on a modified kymograph, showed a close correspondence between rise of tension and various phases of ocular motion." He thinks that the negative results registered with the Schiötz tonometer are due to the fact that that instrument gives varying records according to the curvature of the part of the eye on which it is placed. The manometer alone is therefore available for such an investigation. Lederer remarks that when a muscle and its antagonist contract, they draw the eyeball back against the orbital tissues, and thereby raise its tension.

R. H. ELLIOT.

(3) **Casolino,** of Italy, experimented on dogs with a number of drugs which affect the blood pressure, with a view to ascertain whether there was

any close relationship between the general blood pressure and the intra-ocular tension. He used hydrochloride of cholin and nitrite of amyl as depressors of blood pressure, and adrenalin chloride, strophanthin, and atropin sulphate (neutral) as elevators thereof. Speaking generally, the intra-ocular tension was affected in the same sense as the blood pressure, but this rule was not invariable. Thus, with cholin, the arterial tension fell, whilst the ocular tension showed a rise before the fall; again, with nitrite of amyl, the lowering of intra-ocular pressure was out of all proportion to the fall in blood pressure; and, finally, with strophanthin the blood pressure rise was associated with a fall in intra-ocular tension. R. H. ELLIOT.

(4) **Guglianetti**, of Naples, has conducted an investigation into the influence of high altitude pressure on the intra-ocular tension. The Schiötz tonometer was used, and observations were taken at (1) sea level, and (2) elevations of 3,000, and of over 4,500 metres. Dogs and rabbits were used, as well as human beings. In no case was any influence of the pressure of the high altitudes in evidence. Guglianetti draws attention to the fact that experiments have shown that high altitudes have no influence on general blood pressure. The fatigue factor was carefully excluded.

R. H. ELLIOT.

V.—COLOUR VISION.

(1) **Edridge-Green, F. W.—A criticism of the sight tests of the Board of Trade.** *British Medical Journal*, November 1st, 1913.

(2) **Edridge-Green, F. W.—An analysis of the results of the new sight tests of the Board of Trade.** *British Medical Journal*, August 29th, 1914.

(3) **Nettleship, E.—A pedigree of colour blindness, including two colour blind females.** *Royal London Ophthalmic Hospital Reports*, Vol XIX, part iii, November, 1914.

(4) **Marshall, C. Devereux.—Colour vision and tests for colour blindness.** *British Medical Journal*, December 26th, 1914.

(5) **Percival, A. S.—Colour vision.** *British Medical Journal*, January 2nd, 1915.

(6) **Edridge-Green, F. W.—Theories of colour vision.** *British Medical Journal*, January 9th, 1915.

(7) **The problem of colour blindness.** *British Medical Journal*, January 9th, 1915, p. 79.

(8) **Fraser, R. M.—Colour vision.** *British Medical Journal*, January 16th, 1915.

(9) **Percival, A. S.—Colour vision.** *British Medical Journal*, January 16th, 1915.

(10) **Marshall, C. Devereux.—Colour vision theories.** *British Medical Journal*, January 23rd, 1915.

(11) **Edridge-Green.—Colour vision theories.** *British Medical Journal*, January 23rd, 1915.

(12) **Percival, A. S.—Colour vision theories.** *British Medical Journal*, January 30th, 1915.

(1 and 2) **Edridge-Green**, of London, contributed his two papers to the annual meetings of the British Medical Association, held at Brighton in 1913, and at Aberdeen in 1914.

He stated, in the first communication, that in 1888-9 he wrote a number of papers on colour blindness, which led the Board of Trade to appoint him as a member of the International Code of Signals Committee, and asked him to give them an efficient test for colour blindness. His investigations led him to the conclusion that Holmgren's wool test was very defective. He concluded that a properly constructed lantern was necessary, and that colour names must be used in any test for colour blindness.

These views raised a storm of opposition, because the wool test was at that time considered to be the best. To consider the question, the Royal Society appointed a Committee upon which pure physicists were strongly represented. The Board of Trade wished Edridge-Green to be a member of this Committee, but this was refused. The Committee heard Edridge-Green's evidence, but refused to allow him to demonstrate colour blind persons who could pass the wool test. The report recommended Holmgren's test.

The practical results became so unsatisfactory that in 1911 a Departmental Committee was appointed to investigate the question. The composition of the Committee was adversely criticised at the time—so much so that the Imperial Merchant Service Guild refused to give evidence before it. This Committee, like the former, refused to co-opt Edridge-Green or to allow him to demonstrate his cases. It added two of Edridge-Green's classification colours to the original set, and introduced a lantern. This instrument has no neutral-tinted glasses, and shows one or two small lights simultaneously, which are reflected in a mirror. Having no means of regulating the luminosity of the light, the lantern cannot detect cases which have shortening of the red end of the spectrum. The exhibition of two coloured lights together introduces the phenomenon of simultaneous contrast, and is likely to cause the rejection of normal-sighted individuals, and those with unimportant defects in colour perception. Edridge-Green stated that, in his opinion, this lantern could be evaded by the colour blind, who could be coached up in it to discriminate between its colours by difference in luminosity. It would also eliminate some candidates who ought to be passed. The author severely criticised the form tests. The Board of Trade test types are printed on a roll of canvas, which allows the letters to become distorted, because it assumes a concave form. The surface cracks and becomes yellow. The daylight illumination used is constantly varying, and should be replaced by artificial light.

In his second communication, Edridge-Green points out how his prophecies have become fact. The report of the Board of Trade shows that the lantern, bad as it is, has greatly increased the percentage of rejections, so much so, that it is obvious that either it is rejecting too many, or that the old tests were highly inefficient. The wool test has so far not detected a single man who passed the lantern test. Of 286 rejected, 148 failed in both the lantern and the wool test, and 138 failed with the lantern alone. Nearly 50 per cent. of those who passed Holmgren's test were exposed by the lantern—that is to say, that 50 per cent. of dangerously colour blind persons can pass the improved wool test! The author thinks that the borderland cases, estimated by the Committee at 1 per cent., really number 25 per cent. He pleads for the appointment of a neutral unbiassed committee to re-examine the whole question and to fix a standard of distance at which coloured lights should be detected, with and without conditions of fog. T. HARRISON BUTLER.

(3) This paper has been arranged for publication by C. H. Usher, of Aberdeen. The notes of the pedigree and the chart were nearly complete at the time of **Nettleship's** death, and very few additions have been made to the record as he left it. Unfortunately, no paper had been written. The pedigree contains twenty-nine colour blind persons, of whom two are females, and embraces six generations. The communication does not lend itself to abstraction. To those who are interested in the subject with which it deals, and to all who admire accurate, scientific, and persevering work, it will stand for something more than a mass of carefully-arranged notes, derived from a vast number of observations and enquiries. For a moment the curtain is lifted just sufficiently to give an idea of Nettleship's attitude to life and to scientific work. The glimpse should suffice to inspire many others to "go and do likewise." R. H. ELLIOT.

(4) **C. Devereux Marshall,** of London, contributes an article in defence of Edridge-Green's views. He says that many of us know by experience how the methods advocated by him have won all along the line, and that those who have not been so blinded by prejudice as to refuse to examine the facts have been led by the overwhelming weight of evidence to admit that his theory explains the facts, and that his methods are efficient and reliable for the detection of errors of the colour-sense. It has, however, been freely stated that many, if not most, scientific men have failed to be convinced and have rejected his ideas as untenable. The author proceeds briefly to review the opinions of many eminent men regarding Edridge-Green's work. Professor Stirling says that since Hering's and Helmholtz's theories do not explain the facts of colour blindness, it is better to adopt a purely empirical classification of colour vision, as has been done by Edridge-Green. Professor Halliburton says that the Edridge-Green lantern is one of the best to employ. Professor Schäfer expresses the same opinion. Professor Hamilton thinks that the defect in colour blindness is more likely to be in the brain than in the eye, and gives Edridge-Green full consideration. Sir William Ramsey writes that the broad lines of the Edridge-Green colour vision theory are correct. Professor Porter praises the Edridge-Green lantern and criticises the Board of Trade instrument.

The author points out that Edridge-Green read a paper at the International Medical Congress at Budapest, in the sections of Ophthalmology and Physiology. No adverse criticism was made. After stating that the theory and methods of examination have been favourably received at many other meetings of scientists, Marshall shows how unfairly Edridge-Green has been treated at home, and how Sir William Abney has adopted his methods without acknowledgment. "Methods which he condemned with the greatest energy a few years ago are now given in such a way that it leaves the impression that he has always advocated them, if not that they were actually introduced by himself." Marshall says that the Royal Society should have made some acknowledgment of Edridge-Green's work, especially as the report utterly discredited him and ruined his career.

T. HARRISON BUTLER.

(5) While ample justice is done to Edridge-Green's signal lantern and spectrometer, **Percival**, of Newcastle-upon-Tyne, raises several objections to

his theory of colour vision. Percival alleges that Edridge-Green has never been able to explain satisfactorily on his theory the colour-equation phenomena, to say nothing of the phenomena of Benham's top. In 1909 (see *Trans. Ophth. Society U.K.*, Vol. XXIX, p. 119) Percival brought forward the subject of Benham's top before the Ophthalmological Society, and pointed out that its phenomena could be explained on Young's, but not on Edridge-Green's, theory of hue perception. On that occasion no explanation was brought forward to reconcile these contradictions, either by Edridge-Green or by those who support his views. SYDNEY STEPHENSON,

(6) **Edridge-Green**, of London, re-affirms his position, and criticises several things, among others the defective state of the scientific method of the present time, the referee system of dealing with communications to learned societies, and the method of appointing scientific committees by such societies. He calls upon A. S. Percival to state precisely in what way his explanations were unsatisfactory in regard to the Benham top phenomena. Finally, he states that over 50 per cent. of dangerously colour blind persons can pass the wool test, even in its most approved form.

SYDNEY STEPHENSON.

(7) In the course of a leading article on "The problem of Colour Blindness" published in the *British Medical Journal* of January 9th last, the writer discusses the hypotheses that have been advanced to account for the phenomena of hue perception. As regards Edridge-Green's theory, he points out that there are objections that have not yet been met. He concludes that, like the older theories, that which bears the name of Edridge-Green is still unproven. At the same time he admits that "it is more rational than the crude mechanical explanations of Young and Hering." Edridge-Green's methods of detecting colour blind individuals, however, "rest upon a sure foundation of fact." That they are still violently opposed is due to several things, as, for example, imperfect presentment, the influence of the pure physicists, and the retention of the discredited Holmgren wool test by the Departmental Committee of the Board of Trade. At the same time the writer admits that the report issued by the Committee "was a practical victory for the methods advocated by Edridge-Green."

The article ends with the following words :

"The practical problem is simple, although its simplicity has been obscured by the tests used by the Board of Trade. A seaman or an engine driver has to distinguish between yellow (white), red, and green lanterns. He has to name them to himself and say that is red, that is green, or that is yellow. Common sense demands that he shall be tested with a lantern and asked to name the colours shown. If he fails to do so he is unfit for service ; his function is not to match hues, so that the wool test has no logical basis, and practically it is a complete failure. It does not detect all the dangerously colour blind and it rejects colour blind persons who confuse green and blue but never red and green." SYDNEY STEPHENSON.

(8) **Fraser**, of Belfast, thinks that the scientific value of Edridge-Green's work on colour vision deserves public recognition. To accomplish this, the facts of the case could be brought before individual members of Parliament by the local representatives of a general committee formed for the purpose.

SYDNEY STEPHENSON.

(9) **Percival**, of Newcastle-upon-Tyne, relates how he raised a discussion at the Ophthalmological Society in 1909 on the occasion when Edridge-Green made a communication on the subject of colour blindness. Percival was surprised to find that neither Edridge-Green nor any of his supporters would rise to controvert these views. He quotes textually the letter of

explanation published by Edridge-Green in THE OPHTHALMOSCOPE of April, 1909. Although he disagrees with the Edridge-Green theory of colour vision, yet Percival gives credit to him for his "excellent tests for colour blindness." SYDNEY STEPHENSON.

(12) **Percival,** of Newcastle-upon-Tyne, traverses Edridge-Green's statements and arguments, particularly as regards the colours known to Homer and the colour vision of primitive man. SYDNEY STEPHENSON.

VI.—OPHTHALMOLOGY AND GENERAL MEDICINE.

(*Third Notice.*)

(1) **Coppez, H., and Lint, van.—Five cases of tumour of the hypophyseal region.** *Journ. Méd. de Bruxelles*, Vol. XVII, No. 12, p. 110.

(2) **Fejér, Julius.—Contributions to the diagnosis and operative treatment of tumours of the hypophysis. (Beiträge zur Diagnose und zur operativen Therapie der Hypophysengeschwülste.)** *Klin. Monatsbl. f. Augenheilkunde*, Dezember, 1913.

(3) **Blaauw.—Something about the eye symptoms in Raynaud's disease. (Etwas ueber Augensymptome bei der Raynaudschen Krankheit.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1913, p. 278.

(1) **Coppez** and **van Lint**, of Brussels, relate five cases of tumour of the hypophysis, as under :—

1. Bilateral hemianopsia complicated with semi-blindness to the right and arrest of intellectual and genital development.

2. Exophthalmos, divergent strabismus, nystagmus, acromegaly, vertigo, enlargement of the sella Turcica, hypertrophy of the thyroid body, diminution of the visual acuity, pupillary inequality, hemianopic reaction to light, atrophy of the optic nerves, bitemporal hemianopsia, irritable disposition, pulse 96 per minute, increased blood pressure, and atrophy of the genital organs.

3. Bitemporal hemianopsia, atrophy of the optic nerves, amenorrhœa, and obesity.

4. The same symptoms as No. 3.

5. Hypophyseal tumour having first produced gigantism, then by compression, bilateral choked disc, blindness, anosmia, and vertigo. The tumour having perforated the floor of the pituitary fossa, the cerebro-spinal fluid escaped from the nose and led to a reduction in the symptoms and almost to their disappearance. MARCEL DANIS.

(2) The patient described by **Fejér**, of Budapest, was 21 years of age, but looked much younger, as his physical development was arrested about the age of fourteen. When seventeen years of age, he began to suffer from a progessive failure of vision associated with headache, vomiting, and anorexia. When examined at the age of eighteen, there was bilateral optic atrophy. At twenty-one, the left eye was completely blind, and its pupil reacted only consensually to light, while there was temporal hemianopsia in the right eye. A radiogram showed enlargement of the sella Turcica. The case belongs to the non-acromegalic group of pituitary tumours. The

long, slow course of the symptoms suggested a non-malignant, perhaps cystic, growth, and the condition of the visual fields pointed to involvement chiefly of the left half of the pituitary body.

Operation by the nasal route encountered a cystic swelling of the gland. Its contents were removed partly by puncture and partly by incision and scraping. The facial wounds healed readily with a good cosmetic result, and the operation caused no general disturbance. The examination of the contents of the cyst pointed to cystic degeneration of the gland, followed by colloid change in the cyst contents.

After the operation, there was at first improvement, both in central vision and in the field. Later, there was deterioration of the vision as a whole. The nervous and other symptoms appear to have remained much as before the operation. A. J. BALLANTYNE.

(3) **Blaauw,** of Buffalo, had a patient, a woman of 28, who suffered from chronic conjunctivitis associated with staphylococci which had troubled her for five years. She had attacks of pain in the eyes, accompanied by diminution in her power of vision. Both Blaauw and her previous medical attendant found a different state of refraction every time they examined her. The visual acuity varied from 5/18 to 5/5. She was an anisometrope with decided astigmatism in the left eye. Blaauw suggests that the astigmatism may account for the fact that the attacks of poor vision are always more marked in the left eye. The patient had suffered from "dead fingers" during the period under notice. Blaauw seeks to associate the eye symptoms with this local syncope. No details of the refraction are given, and we are not told whether the eyes were examined under a mydriatic, so that it is quite impossible to express any opinion upon this suggestion. The author summarises the scanty literature which bears upon the association between Raynaud's disease and eye symptoms. Raynaud described a contraction of the retinal vessels which occurred when the fingers became cold. Batten has published a similar observation. But other ophthalmoscopists have failed to detect any such changes in calibre. Blaauw criticises these negative findings, because insufficient details are given. He himself gives no details of the ocular condition in his example, and does not mention the appearance of the fundus. T. HARRISON BUTLER.

VII.—MELANOSIS.

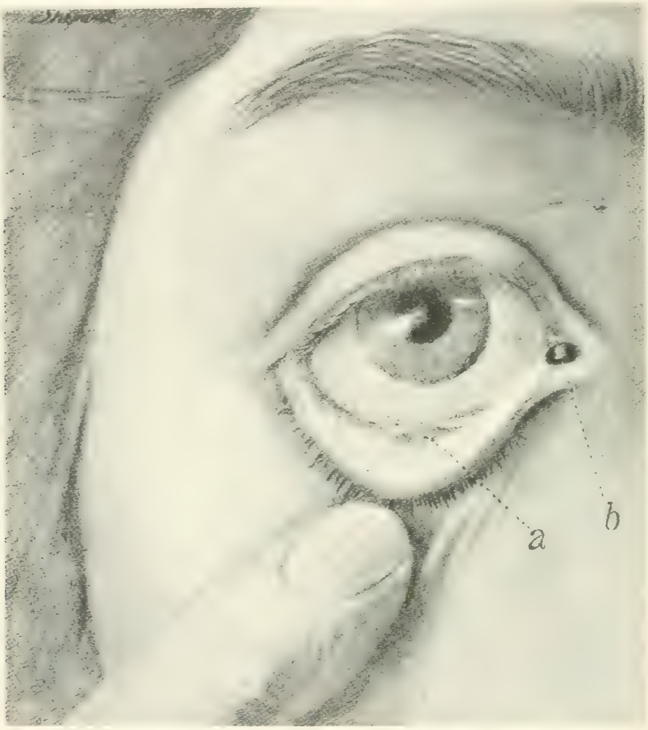
(1) **Randolph, Robert L.—Melanosis of the conjunctiva: report of a case.** *Trans. Amer. Ophth. Society*, Vol. XIII, Part III, 1914, p. 703.

(2) **Smyth, E. J. — Case of extensive pigmentation of the sclera; (?) progressive.** *Trans. Ophth. Society U.K.*, Vol. XXXIV, 1914, p. 142.

(3) **Moore, Foster R.—Four cases of melanoma of the choroid, with a pathological examination in one case; and one case of unusua chronicity, after the dissemination of a melanotic sarcoma had occurred.** *Royal London Ophthalmic Hospital Reports*, Vol. XIX, part iii, November, 1914.

(1) A case of the rare condition, melanosis of the conjunctiva, is placed on

record by **Randolph,** of Baltimore. The facts follow.—A woman, whose age is not mentioned, presented, as shown by the figure, three patches of pigment in the lower conjunctival sac of her right eye. Two of the curious patches were situated almost at the junction with the ocular conjunctiva. The third (*a* in figure) lay well in the palpebral conjunctiva about midway between the outer and the inner canthus. The caruncle (*b* in figure) was of a much deeper shade of pigmentation than the other areas. As to the other (left) eye, there was one small patch of pigmentation in the lower conjunctival sac, and the inferior half of the caruncle was black. The pigmented areas showed no elevation. They had apparently always been present. No opportunity for anatomical examination.



Melanosis of the conjunctiva.

Discussion.

G. E. de Schweinitz, of Philadelphia, had under his notice a patient, now nearly seventy years of age, with marked pigmentation in both conjunctival sacs, with patches of pigment in the semilunar folds and dark pigmentation of the caruncles. Besides all this, he had, as a family peculiarity, large patches of pigment on the lobe, the back, and the outer part of each ear.

A. Quackenboss, of Boston, had seen marked pigmentation extending completely around the cornea in a woman, aged sixty-eight years of age. The caruncle and the conjunctiva of the upper and lower lid were also affected. The condition was congenital. SYDNEY STEPHENSON.

(2) The case exhibited by **Smyth**, of London, was in a female, 20 years of

age, who complained that for a period of about twelve years the white of one eye had gradually become discoloured. The sclera, particularly in its lower-inner part, was occupied by patchy pigmentation. The upper and inner quadrant, on the other hand, remained free from the change. Iris also more pigmented than usual. SYDNEY STEPHENSON.

(3) **Moore,** of London, has sufficiently indicated the scope of his paper in the heading above given. After furnishing the notes of his five cases, and indicating the characters they had in common, he discusses the interesting problem of the potential dangers lying hid in apparently benign melanomata of the eye, and shows from the opinions of others, how difficult it may prove to make up one's mind with any degree of assurance, as to the course any individual case is likely to pursue.

He thinks that there are features which help to differentiate between innocent melanomata of the choroid, and small sarcomata in the earliest stages of their growth, *viz.*: (1) an uniform homogeneous slaty-grey colour of the tumour as seen by the ophthalmoscope; (2) a quite definite but somewhat feathered edge; (3) an absence of all abnormal appearances from the overlying retina; (4) an absence of any pigmentary disturbance around the edge of the growth, and (5) an absence of all symptoms of retinal involvement. In view of the extreme importance of an early and correct diagnosis, he recommends that the growth should be very carefully drawn, the retinal vessels being used to help in the accurate delineation of its limits.

The communication is well illustrated, and there is a good bibliography attached. R. H. ELLIOT.

VIII.—MALE FERN BLINDNESS.

Perrod, J.—Blindness from male fern. (Cecitá de Félix Mas.) *Annali di Ottalmologia*, Vol. XLI. fasc. 1-2, p. 17 to 33.

Perrod, of Turin, narrates the case of a man of 25 years, who had taken, to cure ankylostomiasis, fifteen grammes of male fern in less than twenty-four hours. On the same day, in spite of a saline purgative, intoxication showed itself under the guise of headache, tinnitus, palpitations, vomiting, waves of heat, and agitation alternating with prostration. On the following day, after a sleepless night, the patient found himself to be completely blind. There was moderate mydriasis and no reaction of the pupils. No perception of light. Bilateral papillitis of moderate degree, with signs of stasis, but without hæmorrhage or macular lesions. Despite general treatment and subconjunctival injections of sodium chloride and of sodium nitrate, post-neuritic atrophy supervened, and blindness became complete and definitive.

The author quotes from the work of Stuelp, Sidler-Huguenin, Zimmermann, Siegrist, etc., to insist upon the clinical forms of the ocular affection, upon its grave prognosis, and upon the danger of even moderate doses of oil of male fern. It would be wise to replace this vermifuge by large doses of thymol, such as have been proposed in the treatment of ankylostomiasis by Bozzolo and Graziadei.

Note by the Reviewer.—I note, in passing, a fact mentioned by Perrod: the optic discs of this patient, especially that of the right eye, showed in the atrophic period, "some small heaps of pigment collected on the nasal border of the optic papilla." This new formation, or migration of pigment consecutive to a papillitis (papillitis of moderate intensity and without hæmorrhages), goes to confirm, by an absolutely objective case, the value of the "*cadre pigmentaire*," total or partial, that we have described as posthumous of neuritis, or neuro-retinitis, among the rudimentary ophthalmoscopic stigmata of congenital syphilis. The value of this sign, as we know, has been contested, notably by Wecker and Masselon, who desire to bring it into line with the pigmented choroidal crescent—a physiological detail. But we have insisted upon the clear difference in the disposition and ophthalmoscopic aspect between the choroidal ring and the "*cadre*," or sector of the "*cadre pigmentaire*" around the papilla. I have even seen myself, in the course of several cases of optic neuritis, due to syphilis or to influenza, the appearance of the pigment around or near the papilla.

A. ANTONELLI.

IX.—HÆMANGIOMA OF THE CONJUNCTIVA.

(1) **Adams, P. H.—Hæmangioma of the conjunctiva.** *Trans. Oph. Society U.K.*, Vol. XXXII, 1912, p. 389.

(2) **Mayou, M. S.—Angioma of the conjunctiva.** *Ibidem*, Vol. XXXIII, 1913, p. 55.

(3) **Wibo.—Epibulbar hæmangioma with secondary phlebectasies.** *Société Belge d'Ophtalmologie*, 26 mai, 1914.

(4) **Duyse, D. van.—Hæmangioma of the bulbar conjunctiva with secondary phlebectasies.** *Société Belge d'Ophtalmologie*, 26 mai, 1914.

(1) This case by **Adams**, of Oxford, was in a woman, aged 36 years, who, for about four years, had noticed a red spot slowly growing just above one cornea. On examination, a nearly circular patch, about 1/6th in. in diameter, the details of which were obscured by hæmorrhage, was found, and associated with it was a large subconjunctival hæmorrhage extending half way round the cornea. Some six weeks later, when the hæmorrhage had almost disappeared, the patch was found to be prominent, to have fine red vessels at its centre, and to be surrounded by purplish veins. It was sensitive to pressure.

The growth was eventually excised, and was found to include vessels of two kinds :—(1) large blood spaces, and (2) capillary vessels. The structure, according to the report, indicated that the tissue was in the nature of a fibrous angioma.

SYDNEY STEPHENSON.

(2) **Mayou**, of London, found a red pulsating mass of convoluted vessels in the ocular conjunctiva, not far from the semilunar fold, of a female, 63 years of age. The growth had been noticed for four months. The tumour was removed, and sections showed spaces lined by endothelium containing blood-corpuscles. There was no evidence of the tumour being derived from pre-existing vessels.

SYDNEY STEPHENSON.

(3) **Wibo** showed a girl of eight years affected with exophthalmos. Towards the external angle there existed a bluish tumefaction extending from the limbus towards the external rectus. A similar kind of tumefaction extended in the direction of the corresponding muscle at the upper part of the eyeball. On the inner side the swelling is less clearly limited. The conjunctival veins were swollen, as well as the pericorneal vascular ring. By

compression of the jugular vein, the tumefaction increased in volume. With regard to treatment, the author proposed electrolysis, associated with applications of radium.
MARCEL DANIS.

(4) **van Duyse**, of Ghent, found in a girl of nine years, dilatation of the two ciliary veins which converge towards the tendon of the superior rectus muscle, where there was a neoplastic mass extending towards the equator of the eye. A couple of elevations of the same nature were present on the nasal and the temporal side of the eyeball. Diagnosis.—Hæmangioma. The author intended to treat the condition with radium.
MARCEL DANIS.

X.—HÆMORRHAGE INTO THE SHEATHS OF THE OPTIC NERVE.

Dupuy-Dutemps, L.—Hæmorrhage into the sheaths of the optic nerve. (L'hémorragie des gaines du nerf optique.) *Ann. d'Oculistique*, mars, 1914.

Dupuy-Dutemps, of Paris, gives the histories of two cases of bilateral hæmatoma of the sheaths of the optic nerves due to penetration of intra-cranial sub-arachnoid hæmorrhages into the intervaginal space.

In the first case, which was traumatic, ophthalmoscopic examination, thirteen hours after the accident (fracture of the skull), showed the presence of slight œdema of the discs with indistinctness of their edges, dilatation of the veins, and a number of small scattered retinal hæmorrhages. In the second case, which was non-traumatic, diffuse vitreous hæmorrhages on both sides made it impossible to see the fundus details.

The pathological examination showed in both cases that (1) the intervaginal hæmatoma did not extend towards the globe farther than the anterior part of the cavity, and did not pass the scleral barrier; (2) the blood did not penetrate into the trunk of the optic nerve, but infiltrated the connective tissue around the central vessels, forming a continuous sheath which accompanied them into the orbit, thus constituting a path of propagation of the ecchymosis which had not been previously described; (3) there was œdema of the discs without any inflammatory reaction; and (4) the retinal hæmorrhages originated locally and had no continuity with the hæmatoma.

The author draws the following conclusions from a study of his cases and the literature of the subject:

(1) The ophthalmoscopic signs usually ascribed to hæmorrhage into the sheaths of the optic nerve (ischæmia, late peripapillary hæmorrhage, and secondary pigmentation) have not been found in any case in which such a hæmorrhage has been definitely proved, and are in complete disagreement with anatomical and physiological facts.

(2) The sudden spontaneous unilateral intervaginal hæmorrhage, which is often assumed clinically as the cause of sudden amaurosis, has never been demonstrated, and even if it exists, must be exceedingly rare.

(3) Except in cases of direct traumatism complicated by wounds of the nerve, hæmatoma of the sheaths is always consecutive to traumatic or spontaneous meningeal hæmorrhage. Its only physical signs are congestion

of the disc with more or less marked œdema, dilatation of the veins, and retinal hæmorrhages, variable in number and extent, due to vascular ruptures in the retina.

(4) The ophthalmoscopic lesions are very early, and should appear as soon as the hæmatoma is formed. Their cause seems to be the venous stasis set up by the compression to which the central vein is exposed in its passage through the intervaginal space. It is possible, however, that there may be a complete absence of ophthalmoscopic changes.

Dupuy-Dutemps considers that, apart from the speculative interest of the question, it is important to establish the ophthalmoscopic signs which may accompany meningeal hæmorrhage, since their recognition may furnish an indication for early decompression. R. J. COULTER.

XI.—INOCULATION OF THE EYE WITH VACCINIA.

(1) **Casali, A.—Three cases of vaccinia of the eyelids. (Tre casi di ulceri vacciniche delle palpebre.)** *Annali di Ottalmologia*, Vol. XLI, fasc. 4, p. 245.

(2) **Caillaud.—Vaccinal keratitis with secondary infections. (Kératite vaccinale avec infections secondaires.)** *La Clinique Ophtalmologique*, 10 janvier, 1913.

(3) **Fejér, Julius.—Vaccine pustule on the lid. (Vaccinia auf dem Lide.)** *Centralbl. f. prak. Augenheilkunde*, Juni, 1913.

(1) The accidental inoculation of the eyelids, and especially of their free border, with vaccine gives rise to lesions which frequently differ from those met with after ordinary vaccination. Thus, the pustule is seldom seen, since its delicate wall ruptures so quickly, and the small ulceration becomes covered, not with a black crust, but with a greyish pseudo-membrane, almost diphtheritic, moistened by the tears. Diagnosis is usually simple, especially when the history is obtained.

In the three cases that **Casali**, of Carrara, adds to the sixty (about) mentioned in the literature, the inoculation of material obtained by scraping the lesion into the cornea of the rabbit, followed by the histological examination of sections of the inoculated cornea, revealed the presence of the cytorrhyctes of Guarnieri. We know that these rounded or oval corpuscles, measuring from 1 to 4 in number, nestle in the cytoplasm of the epithelial elements, quite close to the nucleus of the cell. That much is admitted even by authors who dispute their parasitic nature as the specific elements of vaccination or variola.

The use of 2 per cent. picric acid ointment yielded an excellent therapeutic result in Casali's hands. A. ANTONELLI.

(2) **Caillaud** relates at length the clinical history of a very extraordinary case.—A medical man, who was accidentally struck on the eye with a glass vaccine tube which he was breaking, developed in three days a painful eye. Nine days after the accident, he consulted Caillaud, who found a small ulcer of the cornea, violent pericorneal injection, photophobia, blepharospasm, and lacrimation. The pupil and its reflexes were normal. Later, the corneal epithelium completely desquamated, and at this period a fresh ulceration began at the lower part, and was followed by the objective

appearances of interstitial keratitis. Following this again there was a central corneal abscess, which finally broke down, was a long time in cicatrising, and left an extensive leucoma and very poor vision. The iris had been affected and there were posterior synechiæ.

Although Caillaud confesses that he was unable to pick out exactly which was which, he considers that the primary infection was vaccinal and that infections of different origin were added to it in such a way as to modify the clinical characters of the original infection. What the nature of the secondary infection was remains open to question. The patient was a perfectly healthy man; the lacrymal passages were normal; and microscopic examination gave no help. It is not stated whether microscopic examination was made after cultures or directly by smear from the ulcer. The author has been unable to find any similar case recorded. ERNEST THOMSON.

(3) **Fejér**, of Budapest, reports the case of a child of 8 years, who rubbed some of the material from a vaccine pustule on her arm into a scratch-wound of her eyelid. The course of the vaccinia thus caused was normal. There was enlargement of the preauricular gland. The condition healed, leaving a barely visible scar.

The danger of this condition is involvement of the cornea, when it takes the form of a keratitis profunda, and leaves permanent nebulæ. A. LEVY.

XII.—TRACHOMA.

(1) **Bailliart, P.—Granular conjunctivitis. (La conjonctivite granuleuse.)** *Bulletin Générale de Thérapeutique*, 30 octobre, 1912.

(2) **Fox, L. Webster.—Trachoma and its surgical treatment.** *Ophthalmic Record*, December, 1912.

(3) **Meyerhof, M.—The question of immunity to trachoma. (Zur Frage der Trachoma-Immunität.)** *Centralbl. f. prak. Augenheilk.*, Juni, 1913.

(4) **Ferla, J. Addario la.—Upon experimental trachoma in the monkey. (Sul tracoma sperimentale nella scimmia.)** *Annali di Ottalmologia*, Vol. XLI, fasc. iv, p. 278.

(5) **Piccillo, L.—Trachomatous dacryocystitis and blennorrhœa of the lacrymal sac. (La dacriocistite tracomatosa e la blenorrea del sacco lacrimale.)** *Annali di Ottalmologia*, Vol. XLI, fasc. iv, p. 286.

(6) **Kuhnt.—Upon the treatment of trachoma. (Ueber die Behandlung des Trachoms.)** *Zeitschrift für Augenheilkunde*, Dezember, 1913.

(7) **Wootton, H. W.—Trachoma and allied conjunctival affections.** *New York Medical Journal*, March 21st, 1914.

(8) **Meyerhof.—Is there such a thing as natural or acquired immunity to trachoma? (Existe-t-il une immunité naturelle ou acquise contre le Trachome?)** *Revue Générale d'Ophtalmologie*, 30 avril, 1914.

(9) **Cunningham, J. F.—Some points in the management of trachoma.** *Lancet*, July 4, 1914.

(2) The particular object of this communication by **Webster Fox**, of

Philadelphia, is to describe the treatment of trachoma by *grattage*, which he had an opportunity of seeing performed by Darier many years ago when the latter was *chef de clinique* to Abadie, of Paris. The procedures devised by Burow, Kuhnt, and Coover respectively are also touched upon. Fox describes and pictures an eyelid everter of his own invention for the easier exposure of the retrotarsal folds of the upper eyelid. SYDNEY STEPHENSON.

(3) **Meyerhof,** of Cairo, is of opinion that there are no such conditions as natural or acquired immunity to trachoma. He has previously reported cases where patients have acquired trachoma on two or more occasions. He states that no race is immune to the disease. He now records three cases of unilateral trachoma in which the other eye became infected late in the disease or after the first affected eye has been cured. A. LEVY.

(4) Upon two of the lower monkeys (*macacus*), **la Ferla**, of Palermo, has failed to obtain any affection of the conjunctiva comparable with human trachoma, either by scarifications of the conjunctiva and cornea with the implantation of trachomatous products, or by embedding bits of tissue from human trachoma in pockets made with a knife in those structures. Even the authors who have experimented upon the anthropoid monkeys have only succeeded in provoking in the last-named an affection analogous to, but not identical with, human trachoma. A. ANTONELLI.

(5) **Piccillo**, of Palermo, has studied, from the histological point of view, twelve lacrymal sacs extirpated from trachomatous subjects affected with chronic dacryocystitis or blennorrhœa of the sac.

The lesions found with the microscope (description should be read, illustrated with five microphotographs) corresponded perfectly with those described by Moauro, Leber, and C. Addario as characteristic of the trachomatous processes: granulomatous lesions clearly distinguishing themselves from gonococcal lesions (intense catarrhal inflammation) or purely follicular lymphoid lesions. If a large number of trachoma cases do not present lacrymal affections, that is probably because the conjunctival secretion does not infect the lacrymal mucous membrane as long as it escapes freely, thanks to the perfect permeability of the channels. But in presence of a superadded rhinitis, or any other local cause, which favours the stagnation of the discharge in the sac, infection becomes established, with an anatomico-pathological and clinical process quite analogous with that of the conjunctiva. A. ANTONELLI.

(6) **Kuhnt**, of Bonn, read a paper upon the treatment of trachoma to the Congress of the Belgian Ophthalmological Society, in August, 1913.

He insisted that it is essential to treat individual cases with reference to surroundings, to the stage and nature of the disease, and to the social status of the patient, and not to adopt a hide-bound uniform *technique*. He laid down the following indications for treatment:—

(1) Early cases in immune or slightly infected countries must be treated by local medicinal applications. In the presence of secretion, silver nitrate solutions are indicated, followed up by preparations of copper sulphate.

(2) If the disease advances, the granules may be destroyed by the galvanocautery, at the same time continuing the treatment with copper sulphate. Massage and brossage may be helpful, and light treatment may be advantageous (X-rays, Finsen light, and radium).

(3) In the stage of fleshy softening, "expression" is necessary, and the local treatment with caustics must be continued.

(4) In infected regions in early cases, local treatment with caustics (silver salts and copper sulphate) is indicated.

(5) If no result is noted and complications threaten, excision of the infected conjunctiva yields the best results.

(6) In the cicatricial stages no removal of conjunctiva is allowable. It is best to excise the tarsus.

(7) Excision of the tarsus and of the infected conjunctiva is the best means of preventing pannus and of curing existing pannus.

(8) No bad effects are seen after correctly performed surgical operations. They cure trachoma in a few weeks and generally permanently.

Kuhnt rightly objects to the use of such rough instruments as Grady's forceps and Knapp's rollers. They tear the conjunctiva and bruise the tissues, and so increase the tendency to cicatricial contraction. His own "expressor" is much better. It consists of two blades, one of which is perforated. Simple expression, with no dragging along the lids, is possible with this instrument.

We note that the author makes no mention of the use of carbon dioxide snow, which, in the reviewer's hands, has given excellent results, and has taken the place of "expression." T. HARRISON BUTLER.

(7) According to **Wootton**, of New York, it is as difficult to affirm as to deny that trachoma exists as a pathological entity. His experience leads him to state that "trachoma in children is comparatively a rare disease." Wootton classifies the conjunctival conditions common among children as follows :—(1) folliculosis ; (2) follicular conjunctivitis ; (3) thickening of the conjunctiva, with or without visible follicles, and the almost constant presence of Halberstaedter and Prowazek's bodies ; (4) discrete yellowish bodies beneath the surface of the tarsal conjunctiva, especially of the upper lid ; and (5) trachoma. Finally, the author considers the methods of treating trachoma, paying special attention to the surgical treatment. He is convinced that in all cases of trachoma in which the cornea has become involved the Heisrath-Kuhnt operation should be performed. SYDNEY STEPHENSON.

(8) In an interesting and commendably brief article, **Meyerhof**, of Cairo, puts forward reasons for answering this question in the negative. It used to be stated by some writers that certain races were immune, but this is now held to be disproved. All races, black and white, are represented in Egypt, and trachoma occurs in them all.

The fact that unilateral trachoma has been reported in a certain number of cases, has been held to prove that one eye may acquire immunity through the affection of the other. In the first place, before such cases can be accepted, an extremely careful inspection of the sound eye is necessary, in order to exclude the possibility of past trachoma in it. If this be done, the number of unilateral cases becomes very small, and the author's experience of late infection of the sound eye leads him to conclude that such acquired immunity does not really exist.

Lastly, in reply to the question whether individual immunity to trachoma can take place, Meyerhof replies that a previous attack of trachoma confers no immunity. He has observed a fresh infection in over forty cases where the conjunctiva was entirely cicatrised as the result of former trachoma. Two points emerge from this conclusion.—The first is that prophylaxis with regard to the sound eye—whether unaffected or cured of trachoma—is advisable. The second is that sero-therapy is not likely to be of any value.

ERNEST THOMSON.

(9) **Cunningham,** of London, in a letter to the Editor of the *Lancet*, gives his experience of the isolation treatment of a number of boys at Chigwell, Essex, during outbreaks of trachoma in the summers of 1910, 1911, and 1912. The ordinary accommodation being insufficient, the boys were put under canvas in a sloping field, which had a gravelly soil and faced west. The tents were of ordinary army bell-tent pattern with boards. Six boys slept in each tent.

This was in 1910-1911. In 1912 two large marquees accommodated from 100 to 120 boys. There were no boards, but each boy had a mackintosh sheet under the bedding. In none of these three years—and the summer of 1912 is remembered by all—was it necessary to bring any boy in on account of rheumatism or chill. The boys increased in weight during four months, the average increase being 7 lbs. to 8 lbs.

The managers have now erected temporary buildings of wood and galvanized iron on a concrete and brick understructure.

Cunningham also describes the class room and lavatory accommodation.

ERNEST THOMSON.

XIII.—DETACHMENT OF THE RETINA.

(1) **Perlmann.—Upon the causal connection between retinal detachment and accident. (Ueber den ursächlichen Zusammenhang von Netzhautablösung und Unfall.)** *Zeitschrift für Augenheilkunde*, Januar, 1914.

(2) **Batten, Rayner D.—Double detachment of the retina in a boy with albuminuria.** *Proceedings Royal Society of Medicine*, Section of Ophthalmology, Vol. VII, July, 1914.

(3) **Thompson, A. Hugh.—Detachment of retina due to a band in the vitreous following the extraction of a piece of steel.** *Proceedings Royal Society of Medicine*, Vol. VII, July, 1914.

(4) **Higgens, Charles.—Cases of recovery from detachment of the retina.** *Lancet*, September 12th, 1914.

(5) **Eason, Herbert L.—A case of spontaneous recovery from detachment of the retina.** *Lancet*, January 2nd, 1915.

(6) **James, R. R.—A case of retinal detachment in a myope treated with rest in bed, retaining useful vision for the past two years.** *Ophthalmic Review*, January, 1915.

(1) **Perlmann**, of Iserlohn, discusses, from the standpoint of Compensation Acts, the relationships which exist between retinal detachments and accidents.

He decides that :—

1. Accidents associated with perforation of the eyeball can cause detachment, whether the eye be disposed to the catastrophe or not. In this case the causal connection can hardly be disputed.

2. If a detachment is caused by a new growth we can almost always say that the tumour was not caused by the accident.

3. Contusion of the globe never causes detachment in a previously sound eye.

4. There are a certain number of individuals who on account of ocular or general diseases are always threatened with detachment. This occurs spontaneously when the disease has advanced sufficiently, without the action of any external force.

5. If it can be shown that detachment immediately follows an accident, the responsibility of this accident for the detachment must be admitted in spite of serious scientific objections.

6. Mere strain during work must never be held to be a cause of retinal detachment. T. HARRISON BUTLER.

(2) The case detailed by **Batten**, of London, seems to be of much interest. On the one hand, the patient, aged 14 years, was hypermetropic in refraction, and, on the other hand, he suffered from albuminuria, which was supposed, according to Sir W. P. Herringham, to be due to a true chronic nephritis. As Batten remarks, a number of cases have been reported in which detachment and albuminuria with nephritis have been associated, and a few with cyclic albuminuria; "the fact is difficult of explanation, but there seems to be no doubt about the association." ERNEST THOMSON.

(3) The point of special interest in the case reported by **A. H. Thompson**, of London, was the presence of a fibrous band extending from a point just up and in from the disc, where the foreign body was originally lodged, inwards and forwards towards the ciliary region and the hole in the iris which it had made on entry. S.E.

(4) **Higgens,** of London, in recording the only three cases of recovery from retinal detachment which he has seen during a long professional experience (one of which cases was shown in London in 1902 and remained well in 1913), takes occasion to express his opinions on the subject in the following words:—

"During the last few years the science of ophthalmology has been advanced by leaps and bounds, but it seems to me that in many ocular affections the treatment, so far as it is effective, is about where it was thirty years ago. The cases under consideration are examples of a disease the treatment of which leaves much to be desired, and, so far as results are concerned, is no better now than it was many years ago. All operative treatment is, in my experience, worse than useless. I have never seen a case in any way benefited by any of the operations that have been recommended, but I have seen some which have been made worse. The treatment that seems to me to hold out the best, if only a slight, hope of cure, is by rest in the horizontal position continued for weeks, and measures which may be supposed to cause removal of fluids: such as sweating, purgation, absorbents, and abstinence from fluid nourishment as far as it is possible to live without it. I have reported the cases as recoveries from detachment of the retina, which is a fact; but I have grave doubts as to whether the result was due to the treatment adopted, or was merely coincident with it." ERNEST THOMSON.

(5) Apart from the interesting fact, reported by **Eason,** of London, that once again a severe retinal detachment, due to high myopia, has surprised all concerned by becoming re-attached, while the vision and field were restored, the author's remarks on the subject attract one's attention:—

"I do not know that any satisfactory explanation has been given of the fact that in cases of detachment of the retina, vision only remains in abeyance, and is restored immediately the retina once more comes in contact with the choroid. The loss of vision can hardly be due to any failure of vascular or lymphatic circulation, as under these circumstances the retina would degenerate rapidly after detachment, and recovery after an interval of any length would be impossible. The retina always strips away, leaving the layer of pigment epithelium attached to the choroid, and it seems probable that without the pigment epithelium, and possibly the visual purple, the other layers of the retina cannot perceive light. At any rate, for some long period after a detachment the nutrition of the retina remains quite unimpaired, and vision is recovered immediately contact with the pigment layer is restored. The extremely defective vision of pronounced albinos suggests that the pigment layer of the retina is essential to vision, and that in detachment of the retina it is the separation of the rods and cones from the pigment epithelium that causes the blindness over the area of the detachment." ERNEST THOMSON.

(6) The main facts of this case by **R. R. James**, of London, are as follows.—A myopic patient, now aged 44 years, received an injury to one eye when aged 25 years, in consequence of which the retina of that eye became detached. No treatment was adopted. Eight years after the injury, the lens of that eye was opaque, and perception of light was absent.

Sixteen years after the original accident, the retina of the other eye became detached, possibly as the result of a severe bout of coughing. From November 23rd, 1912, to December 28th, 1912, the patient was kept in bed flat upon his back, but on the latter date was allowed a pillow. After November 30th, subconjunctival injections of normal saline were given twice a week. On January 3rd, 1913, the patient was allowed to get up, as there had been considerable improvement during the six weeks' rest in bed. Somewhat later (January 29th, 1913), the vision of the affected eye with *minus* 13 D. sph. was 6/60. No detachment, but "floaters" in the vitreous. In July, 1914, V. (corrected) was 6/12 (letters), much as it had been before the retina became detached.

James claims no credit for this unusual and gratifying result, for, as he writes, "I am convinced that nothing I did for the man had the slightest effect on his retinal condition."

The author terminates the account of an interesting case with a few remarks deprecatory of the surgical treatment of detached retina in general.

SYDNEY STEPHENSON.

XIV.—ASSOCIATED MOVEMENTS OF THE UPPER LID.

Lutz, A.—A case of associated movement of the upper lid, which could also be voluntarily produced. (Ueber einen Fall von Mitbewegung des Oberlides, die auch willkürlich hervorgerufen werden kann.) *Klin. Monatsbl. f. Augenheilkunde*, Januar, 1913.

A number of cases have been published in which elevation of the upper lid occurred in association with depression of the jaw, twisting of the jaw to one side, or such movements as those of sucking, swallowing, and smiling. These are what Munk calls "principal" movements as contrasted with the "special" movements of whistling, wrinkling of the brows, etc.

The probable seat of the lesion in these cases has been much discussed. **Lutz** places it in the region of the supranuclear centres on the following grounds.—It cannot be infranuclear, for there is no loss of the absolute mobility of the lid, there is not always involvement of the other branches of the third nerve, and ophthalmoplegia interna is never present. It cannot be attributed to a lesion of the nerves after their exit from the base of the brain, with abnormal linking of the branches during regeneration, for there is no affection of the pupil, and there is often no paresis of the branches of the third nerve. A peduncular lesion is excluded by the absence of any symptoms pointing to a lesion of the pyramidal fibres. The absence of paralysis of the branches of the third nerve, and even of ptosis itself in some cases, excludes a nuclear lesion. An abnormal origin of the levator innervation from one of the neighbouring nuclei is very improbable, for the condition is not always congenital, but may set in after injury or other cause. In some cases, also, it has disappeared in later life. The peculiarities of these cases are consistent with a supranuclear lesion. Such are the absence in some cases of ptosis and all other complications, and the incompleteness of the ptosis if present. There is also the complication sometimes found of paralysis of other nerves whose nuclei are at a distance from that of the levator (the sixth and fourth). Lesions of the cortical paths are excluded because the complicating paralyses, when present, are paralyses of individual branches. Moreover, the case here reported showed ability to produce the forcible elevation of one upper lid without the associated movement of the jaw.

The patient was a man, 27 years of age. The phenomenon in question was first noticed at the age of five. There was slight ptosis on the right side, and, with a coloured glass, diplopia could be elicited, corresponding to paresis of the right superior oblique. Elevation of the right upper lid was induced by opening the mouth, or by moving the jaw to the left side, but the patient could also elicit the movement voluntarily without any movement of the jaw. The latter is a peculiarity which has not been present in any of the previously published cases. It is impossible normally to elevate one lid alone. We have here a disturbance of co-ordination, which is consistent with the view that the lesion is supranuclear in the posterior longitudinal bundle or optic thalamus. The author thinks that the disturbance of co-ordination can be best explained by assuming the loss of some normal inhibitory power. That the lesion, though supranuclear, is in the region of the nucleus, is suggested by the fact that in some cases there was paralysis of some other branch to the ocular muscles. A. J. BALLANTYNE.

XV.—DACRYOPS.

(1) **Lacompte, Frans.—An interesting case of dacryops. (Un cas intéressant de dacryops.)** *Ann. d'Oculistique*, octobre, 1913.

(2) **Bride, T. Milne.—A case of dacryops.** *Ophthalmic Review*, April, 1914.

(1) **Lacompte**, of Ghent, records the case of a man, aged 45, who complained of discomfort and tension "at the upper part of the external canthus" of the right eye. The right upper eyelid was found to be red and slightly swollen, and on everting it, a tumour, the size of a small bean, was seen projecting between the eyeball and the eyelid over the situation of the lacrymal gland. There was also an adherent leucoma in the eye, the result of an injury during childhood. On everting the left eyelid, a similar but smaller tumour was discovered, and a brother of the patient was found to have similar tumours, both of them about the same size as that in the patient's left eye. The author calls attention to the influence of heredity in the causation of dacryops, and suggests that the greater development of the tumour in his patient's right eye was due to photophobia and lacrymation caused by the corneal lesion. R. J. COULTER.

(2) The patient, an infant, was noticed to have a bluish, translucent, and fluctuating tumour between the upper lid and the globe. The tumour, which was removed by **Bride**, of Manchester, was the size of a pigeon's egg. On microscopic examination, it was found to be lined by a single layer of epithelial cells and contained proteid, chlorides, and a few leucocytes.

A. H. PAYAN DAWNAY.

XVI.—PATHOLOGY.

(First Notice.)

(1) **Morax and Landrieu.—On hyaline degeneration of the subconjunctival and epitarsal tissue of the two upper eyelids. (Dégénérescence hyaline du tissu sous-conjonctival et épitarsien des deux paupières supérieures.)** *Ann. d'Oculistique*, janvier, 1912.

(2) **de Poppen.—Amyloid degeneration of the conjunctiva and tarsal cartilage. (Dégénérescence amyloïde de la conjonctive et du cartilage tarsien.)** *Ann. d'Oculistique*, août, 1913.

(3) **Kolominsky, J. J.—A case of hyaline-amyloid degeneration of the conjunctiva. (Ein Fall von hyalin-amyloider Degeneration der Konjunktiva.)** *Klin. Monatsbl. f. Augenheilkunde*, November, 1913.

(1) **Morax** and **Landrieu**, of Paris, record a case of hyaline degeneration of the subconjunctival tissue. As is usual in this disease, the patient, a woman aged sixty years, with a diabetic history, complained of slight irritability of the eyes and difficulty in seeing, the latter being due to ptosis caused mechanically by thickening of the conjunctiva.

The appearance of the patient was characteristic.—The upper lids were swollen and thickened, the upper palpebral fold was higher and more marked than normal, the mobility of the lids was normal, except that elevation was definitely limited owing to their thickened condition, so that the upper third of the pupil could not be uncovered. The conjunctiva of the lower *cul-de-sac* was yellow, and there were some hæmorrhages in it, the bulbar conjunctiva was ecchymotic, especially above and in the right eye, the palpebral conjunctiva was œdematous and formed a kind of fold which covered the globe like the membrana nictitans of a bird, but in the upper part. Eversion of the eyelids, which could only be performed with great difficulty, caused several small ecchymoses in them. The tarsal conjunctiva contained numerous irregular prominent yellowish hypertrophies and the tarsus felt thickened.

The diseased tissue was excised, and the condition of the patient much improved thereby. Pathological examination showed that the masses removed consisted of hyaline tissue containing islets of bone. There was no amyloid reaction.

The majority of the reported cases of this rare affection have occurred in inhabitants of the Baltic coast, but three were in Belgians. Most of the patients were young adults, and about half of them had trachoma. The points of interest about the case under consideration are the advanced age of the patient, and the fact that she was French. Pathologically, the presence of ossification without any amyloid reaction negatives the theory which has been put forward in these cases, that the latter is a link between hyaline degeneration and ossification. R. J. COULTER.

(2) **de Poppen**, of Petrograd, records three cases of amyloid degeneration of the conjunctiva complicating trachoma, and one case of amyloid degeneration of the conjunctiva and tarsus in a patient free from trachoma. He describes the pathological changes found on microscopic examination, and considers that they show that (1) amyloid degeneration attacks with equal vigour, and at the same time, normal tissues and those altered by inflammation; (2) all the tissues of the conjunctiva take an active part in the degeneration, although in differing degrees; (3) the disappearance of the

cartilaginous fibres of the tarsus is due not only to their active participation in the process, but also to passive compression by the growing pathological tissue. R. J. COULTER.

(3) The condition described by **Kolominsky**, of Dorpat, is said to be more common in Russia than elsewhere. The patient, a female of 44 years, had suffered for twenty years from increasing thickening of the upper lids and drooping of the right. Examination showed almost total ptosis on the right side. In the right upper lid there were two nodular resistant bodies, fixed to the deeper structures of the lid, but not attached to the skin. One of them extended into the depth of the orbit. Eversion of the lid was impossible. Another similar mass was found in the left upper lid, and several in the right lower lid. After canthotomy on the right side, it was possible to evert the upper lid. The conjunctiva was found to be uneven and of waxy-yellow colour, and a tumour of similar appearance occupied the fornix. These, and the conjunctival tumour of the lower lid, were excised, and at a later date the same operation was performed on the left side.

The microscopic characters of the tissue were as follows.—The conjunctival epithelium was swollen and vacuolated, and underneath it were collections of leucocytes. Below this masses of degenerated tissue of varying shape were found. Some showed amyloid staining at the periphery and hyaline staining at the centre, indicating, in the author's opinion, a transition from the hyaline to the amyloid state. Some of the masses showed calcareous degeneration, or even ossification, at the centre. In all sections there was a rich new formation of vessels, as well as of other thin-walled blood-spaces. The walls of some of the blood-vessels were degenerated, with thickening of such a degree as to obliterate the lumen, and many of the thin-walled blood-spaces were filled with amyloid material, so that they resembled masses of amyloid material enclosed in a thin capsule. The author looks upon the condition as a kind of angioma with hyaline-amyloid degeneration, not limited to the connective tissue, but also affecting the walls and contents of the vessels. He could find no changes in the cells suggesting amyloid degeneration of these elements. A. J. BALLANTYNE.

XVII.—OPERATIONS.

6.—Pterygium.

(1) **Uribe-y-Troncoso.—A note on a new operation for pterygium. (Note sur une nouvelle opération du ptérygion.)** *Ann. d'Oculistique*, août, 1914.

(2) **Terson.—Operation for pterygium. (Opération du ptérygion.)** *Ann. d'Oculistique*, août, 1914.

(1) **Uribe-y-Troncoso**, of Mexico, recommends the following operation for the cure of pterygium.—1. Dissection of the head from the cornea and limbus down to the sclerotic with a bistoury, and removal of all adherent tissues from the surface so exposed with a sharp curette. 2. Removal of the conjunctival triangle previously adherent to the cornea, by a vertical incision with scissors. 3. The retraction of the conjunctiva causes this to leave a semi-circular bare area, which is covered by making two incisions in the conjunctiva above it, freeing the flap between them, and suturing it to

the conjunctiva at the edge of the bare area below. 4. The edges of the vertical wound are brought together by a couple of sutures.

The author has used this method exclusively for over two years in a district where pterygium is common, and has seen only one recurrence.

R. J. COULTER.

(2) **A. Terson**, of Paris, recommends the following operation for the cure of pterygium.—1. Excision of the body of the pterygium with fine straight scissors and formation of a rectangular flap in the conjunctiva below it. 2. Detachment of the head of the pterygium with a convex bistoury or a trephine, and removal of threads of tendinous *débris* by scraping. If a graft is not applied, this may be followed by slight cauterisation. 3. Sutures of the conjunctival flap to the *sclerotic* above the seat of the pterygium with fine silk or reindeer tendon (not catgut). Special attention should be paid to the stitch nearest to the cornea. 4. Transplantation of a graft from the top of the cornea to the seat of the head of the pterygium. Binocular bandage. Silk stitches should be removed not earlier than the sixth day. In slight cases the corneal graft is not necessary.

R. J. COULTER.

XVIII.—REMEDIES.

(*Second Notice.*)

(1) Leber, A.—The effect of quinine upon the conjunctiva and cornea. (Chininwirkung auf Bindehaut und Hornhaut.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1913.

(2) Davis, Edward A.—The diagnostic and therapeutic uses of tuberculin in ocular diseases, with a review of some of the claims made for it. *Annals of Ophthalmology*, January, 1914.

(3) Tristano, B.—Electrargol in ocular therapeutics. (L'electrargol en thérapeutique oculaire.) *L'Ophtalmologie Provinciale*, mars, avril, 1914.

(4) Fromaget, Camille.—The inefficiency of neosalvarsan in the keratitis of congenital syphilis. (Inefficacité du néosalvarsan dans la kératite hérédo-syphilitique.) *L'Ophtalmologie Provinciale*, juin, 1914, and *La Clinique Ophtalmologique*, 10 août, 1914.

(5) Terlinck.—Upon consecutive iritis. (Ueber Iridorezidiven.) *Zeitschrift für Augenheilkunde*, Juni, 1914.

(6) Wray, C.—Case of 6 D. of hypermetropic astigmatism cured by the cautery. *Transactions Oph. Soc. U.K.*, 1914.

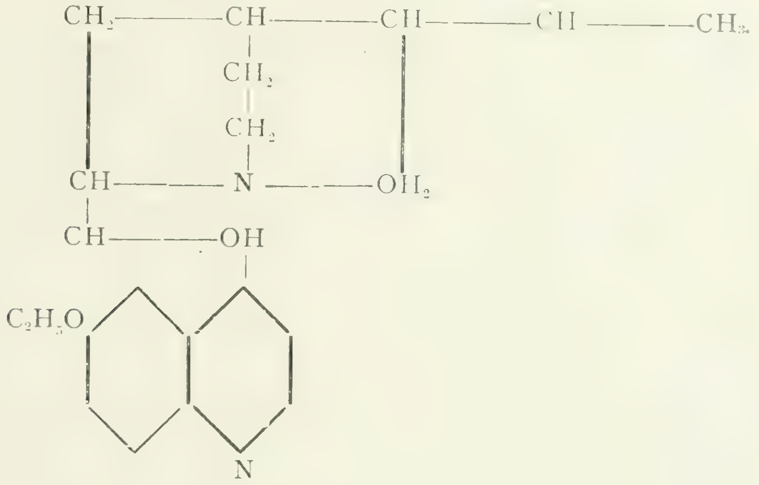
(7) Cecchetto, E.—Atoxic antigonococcic vaccine of Nicolle and Blaizot in the treatment of gonorrheal conjunctivitis. *Annali di Ottalmologia*, 43rd year, page 202.

(8) Donaldson, R.—Nicolle and Blaizot's vaccine in the treatment of gonorrhœa. *British Medical Journal*, November 14th, 1914.

(9) Dunn, Percy.—"Strumous habit of body." *Lancet*, December 5th, 1914.

(10) **Roe, A. Legge.**—Collosol argentum and its ophthalmic uses. *British Medical Journal*, January 16th, 1915.

(1) **Leber,** of Göttingen, has tried the effect of a 1 per cent. solution of quinine upon trachoma in Sumatra. It appeared to diminish the subjective sensations, but had no real effect upon the disease. The cell inclusions, however, lost their outline and degenerated. He also tried an oily solution of a derivative of hydroquinine, ethylhydrocuprein, upon hypopyon-ulcers. Some were favourably influenced, but others progressed uninfluenced by the drug. The formula of the drug is:



Discussion.

Löhlein, of Greifswald, said that there was no evidence that the cell inclusions were the cause of trachoma, and Leber's observation that quinine destroyed these inclusions, but did not influence the disease, strengthened the conclusion. Experiments made in the Greifswald Clinic had shown that quinine had no influence upon trachoma. **Goldschmidt,** of Leipzig, said that ethylhydrocuprein had been used in cases of serpent ulcer with success, and it had proved useful also in dacryocystitis.

The writer of this abstract has used an ointment of ethylhydrocuprein with success in an intractable case of ulcus serpens at the Birmingham Eye Hospital, where it has been found to be a very useful drug in such cases.

T. Harrison Butler.

(2) **Davis,** of New York, contributes an interesting and valuable article on the diagnostic and therapeutic uses of tuberculin in the treatment of ocular diseases.

The history of the subject is first dealt with, great credit being given to von Hippel for the part he played in interesting ophthalmologists in tuberculin at a time when it was dangerously discredited.

The tuberculin reactions are next reviewed, and the dangers and fallacies of the various tests are dealt with. The diagnostic procedure recommended is as follows.—(1) To make the v. Pirquet test, with the undiluted old tuberculin of Koch, and, if in doubt, to repeat this test in three or four days' time; (2) if the v. Pirquet test is positive, unless in a very young child, it is supplemented by the subcutaneous test, 0·5 m.grm. of old tuberculin being given; if this is negative, a second injection of 2 mg. is given, and if still negative, a third of 5 mg. These all proving negative, tuberculosis is excluded as the cause of the trouble. When the subcutaneous test proves positive, especially if a focal reaction takes place, Davis thinks that the ocular trouble is definitely shown to be tuberculous.

He also gives old tuberculin a high place in the therapeutic application of tuberculin, but he personally prefers to use B.E., with which he has had most experience. He belongs to the school which aims at producing mild reactions, and which is not afraid of seeing slight focal symptoms. He recommends an initial dose of 1/500 mg., increased rather rapidly by 1/500 mg. each dose, at intervals of from two to five days, until as much as 1 mg. or 2 mg. are given at a single dose, care being however taken to avoid an excessive reaction, "for example, not to raise the temperature more than 0·5 to 1·0 degree F. above normal, or to cause more than the mildest focal reaction in the eye." He has abandoned opsonic index tests. The point of the method is to be found in the words quoted from Hamman and Wolman, that "an active reaction to tuberculin is certainly an indication of successful response to the infection, and of the development of a high grade of immunity to re-infection."

The clinical side of the question next comes in for attention, and this section, in common with the whole paper, is well worth careful perusal. Perhaps the most interesting observation of all is that which deals with episcleritis and allied affections. A well-deserved tribute is paid to the work done by S. Stephenson and G. Carpenter on tubercle of the choroid. Possibly the views expressed on the tuberculous origin of Parinaud's disease will be challenged by many as too sweeping. In any case the paper is one that will well repay careful perusal. R. H. ELLIOT.

(3) **Tristano,** of Palermo, reports the results of sixteen eye cases treated with electrargol, and comes to the conclusion that, as a prophylactic, it is satisfactory, and, as a curative agent in the different varieties of suppuration and inflammation, it is efficient. Its use, either as drops or injections, is unaccompanied by pain; on the other hand, it is soothing. In order to produce the best results, it should be tried as early as possible. The drug is useful in the complications of cataract operations, *e.g.*, general toxic conditions, conjunctival infections, dacryocystitis, and lacrymal obstructions. The operation of iridectomy was successfully performed on a case in the presence of several of these contra-indications, owing to the prophylactic use of electrargol. In all the reported cases the colloid was administered in moderate doses, and acted quickly and energetically; it increases the defensive power of the individual and has a definite bactericidal action. This electrically prepared silver colloid has many advantages over the chemically prepared colloids. It is supplied in 5 c.c. *ampoules* together with others containing sodium chloride, in the necessary proportion to produce, on mixing, an isotonic solution. Precipitation of the metallic particles is prevented by preparing it in this manner. The dose commonly employed is 5 c.c.; in cases where an energetic action is desired, 10 c.c. can be injected; while in certain cases where the desired result was not produced, 20 c.c. were injected in one day. The treatment was always discontinued when the condition showed signs of clearing up. For use as drops, a special solution is prepared, and the drug is allowed to remain in contact with the eye for several minutes; instillations are made several times daily, and continued for some time after a cure has set in. P. A. HARRY.

(4) For eight months **Fromaget,** of Bordeaux, treated all cases of syphilitic keratitis with neosalvarsan, injected intravenously. The object

was to discover whether this had any advantages over mercurial treatment. He briefly records the history and method of treatment of seven cases, and comes to the following conclusions:

Neosalvarsan does not cure congenital syphilitic keratitis; the condition is not even checked or arrested; and it certainly does not prevent the other eye from being attacked. The duration is not shortened. The drug has no favourable action on the symptoms which accompany the keratitis. It however improves the general condition of the patient and in this respect it differs from the mercurial preparations. In acquired syphilis the results are satisfactory. The author believes that in congenital cases the organisms must be in some unknown state whereby they resist the action of chemical substances; the means must therefore be discovered to render them susceptible to toxic substances. P. A. HARRY.

(5) The German word *Rezidiv* generally means a *relapse*, but it has been applied to those cases of optic neuritis which follow injections of salvarsan, and so we cannot translate the word literally. Perhaps "consecutive neuritis" best expresses the German word.

Terlinck, of Brussels, describes cases in which iritis appeared after salvarsan just as optic neuritis follows an injection of '606.' The fresh case had previously suffered from "consecutive neuritis" after salvarsan. The iritis appeared three days after a second injection of 60 c.cm. of the drug, which was given four months later. In discussing the case, Terlinck states that Ehrlich has suggested that these not infrequent cases of consecutive neuritis may depend upon the drug itself, and not, as many have laboured to prove, upon the syphilis. T. HARRISON BUTLER.

(6) The report of this case by **Wray**, of London, is incomplete in that it is not specifically stated, although it is inferred, that there was 6 D. of astigmatism in each eye. Apparently, cautery operation on the right eye left matters where they had been before, *i.e.*, V.A.—C. + 6 D.cyl.= 6/6. In the left eye four cautery operations left the V.A. = 6/6 with + 0·5 D. sph + 1 D. cyl. S. E.

(7) The atoxic vaccine used in **Cecchetto's** four cases was obtained privately from Nicolle (of the Pasteur Institute of Tunis), who, with Blaizot, first announced the discovery of the vaccine before the Urologic Association of Paris in October, 1913. Three of the cases described were in infants. In a child of three days, gonorrhœal ophthalmia was treated for five or six days without success, and corneal ulcer developed in one eye. The day after the first subcutaneous injection of vaccine there was marked improvement, and complete recovery followed a second injection, the corneal ulcer healing in about a week. Similarly rapid recovery followed the use of the vaccine in the other two infantile cases. In the adult case, with enormous palpebral œdema and beginning corneal ulcer, three injections on successive days were required before marked improvement occurred. After a fourth injection, the ulcer began to show vascularity. *Ophthalmic Literature*, October, 1914.

(8) **Donaldson**, of Reading, gives an account of the method of preparation of Nicolle and Blaizot's vaccine ("Dmegon"), and of the literature so far published dealing with its effect in gonorrhœal cases. After trying the product in four cases of gonorrhœa (acute and chronic), he concludes that "the vaccine has not completely fulfilled the claims of the authors and their colleagues."

As to the rapidity of its action in cases of ophthalmia neonatorum, he considers that a sufficient number of cases has not yet been recorded to decide the point. SYDNEY STEPHENSON.

(9) In the course of a letter to the Editor of the *Lancet* dealing with the

so-called "Strumous habit of body," **Dunn**, of London, incidentally mentions the success he has had in cases of "strumous ophthalmia" from thyroid medication. SYDNEY STEPHENSON.

(10) Collosol argentum is a clear, sherry-like fluid, which contains the metal silver in a state of suspension in extremely fine particles. Laboratory experiments go to show that exposure for six minutes to its action destroys any known microbe.

Roe, of Hull, has used the undiluted product for the last three years, and now speaks in the highest possible terms of its effect in practically all the external diseases of the eye. The only reservation he makes, in fact, is in the various forms of conjunctivitis (excepting those due to gonococci), where he has not found the new product to be as efficient as the ordinary remedies. In burns of the conjunctiva or cornea or eyelids he employs a 50 per cent. collosol ointment. SYDNEY STEPHENSON.

NOTES AND ECHOES.

Deaths.

HARD upon the heels of the news that he had been appointed consulting ophthalmic surgeon to the Sheffield Royal Hospital, comes the announcement of the death of Stanley Riseley, which took place on February 5th at Ashlands, Park Lane, Sheffield, at the early age of 47 years. He had been ill for a long time, and his death was not wholly unexpected. Riseley was a native of Bristol, son of Mr. Henry Riseley, a solicitor and ex-sheriff of that city, and a nephew of Mr. George Riseley, director of the Bristol Musical Festival. Riseley was a graduate of Edinburgh University, and had practised since 1898 as an ophthalmic surgeon in Sheffield. He held the posts of ophthalmic surgeon to the Sheffield Royal Hospital, and to Rotherham Hospital. He occupied the presidency of the Sheffield Medico-Chirurgical Society in 1912. A widow and five young children survive him.

The death is announced of Jules Auguste Barde, in his 74th year. He studied under Albert von Graefe in Berlin, and afterwards became assistant to Meyer of Paris. In 1869 he established a private eye clinic at Geneva. In 1874 Barde became director of an institution for the free treatment of eye disease founded by Baron Adolphe de Rothschild at Geneva, a position he kept until death claimed him. Although offered the chair of ophthalmology, which was founded in Geneva in 1876, he preferred to retain his post at the Rothschild Institute.

* * * *

Appointments.

THE following names constitute the ophthalmic department of the King George Hospital :—

Sir G. Anderson Critchett, Bt., C.V.O., surgeon-oculist to the King; Sir William Collins, K.C.V.O., consulting surgeon, Western Ophthalmic Hospital; Ernest Clarke, F.R.C.S., senior surgeon, Central London Ophthalmic Hospital; William Lang, F.R.C.S. consulting ophthalmic surgeon, Middlesex Hospital.

Major William Herbert Brailey, eldest son of Mr. W. A. Brailey, consulting ophthalmic surgeon to Guy's Hospital, London, has been appointed consulting ophthalmic surgeon to the General Hospitals for the Indian troops. Dr.

Brailey served in the C.I.V. during the South African War, and came home with a medal and three clasps. He mobilised with the 2nd Eastern General Hospital at the outbreak of the present war. Major Brailey has acted as medical transport officer, and it is interesting to note that the King, during his visit to Brighton on January 9th last, congratulated him upon the admirable transport arrangements, and told him that in that respect Brighton held the record for England, having secured it by transporting the first batch of wounded Indians, 344 in number, from the train to the hospitals in just over an hour.

Edward Roberts, consulting surgeon to the Royal Eye Hospital, Manchester, has been appointed President of the Aberystwyth Infirmary.

George H. Oliver has been appointed surgeon to the ophthalmic department at the Royal Eye and Ear Hospital, Bradford.

Henry L. G. Leask has been appointed surgeon to the Glasgow Eye Infirmary.

V. D. Nimbkar has been appointed resident ophthalmic officer at the General Infirmary, Leeds.

P. G. Doyne, son of Mr. R. W. Doyne, has been appointed senior ophthalmic house surgeon at St. Thomas's Hospital, London.

* * * *

A Dublin Lectureship in Ophthalmology.

UNDER the will of the late Robert John Montgomery, a Dublin ophthalmologist who died in 1912, a sum of money has been bequeathed for the institution in Dublin of a lectureship in ophthalmology. It will be known as the "Mary Louisa Prentice Montgomery Lectureship in Ophthalmology," and the appointment is open to all, irrespective of nationality, college or qualifications. The salary amounts to about £160 per annum. The appointment vests each alternate five years in the hands of the Board of Trinity College, Dublin, and of the Council of the Royal College of Surgeons in Ireland. The first appointment will be made shortly. Candidates should send in their applications, together with copies of not more than two testimonials, to the Registrar of the School of Physic, Trinity College, Dublin, before April 15th, 1915. The lecturer shall be appointed for one year, but shall be eligible for re-appointment, year by year, for a period not exceeding five years. Candidates are expected to state in what centre and in what branch of ophthalmology they propose to study. The successful candidate is expected to give one or more formal lectures in each year in Dublin upon the subject to which he has devoted his attention whilst holding the Lectureship.

* * * *

University of Oxford: Diploma in Ophthalmology.

IT is announced officially that the examination for the Diploma in Ophthalmology of the University of Oxford will commence on Monday, July 19th next.

* * * *

A City of the Blind.

AT the Central Poor Law Conference at the Guildhall on February 10th last, the Rev. G. A. Suttle, late chairman of the West Ham Board of Guardians, in the course of a communication on "The Poor Law in relation to the Blind" said that in England and Wales 8,000 blind persons were assisted by Boards of Guardians. Quite 5,000 might have been saved from blindness had they been properly attended to at birth. The aged and infirm blind should be at once pensioned, but there were 12,000 capable of being employed, and ready to make efforts at self-support. He sketched a plan by which the State should apply some of the capital invested for the benefit of the blind to the establishment of a township in which blind persons should be gathered and trained in industries for their own support.

* * * *

Annales d'Oculistique.

WE observe that the editorial staff of our contemporary, the *Annales d'Oculistique*, has been strengthened by the addition of Dupuy-Dutemps (Paris), Gallemaerts (Brussels), and Rochon-Duvigneaud (Paris). One is glad to note that Morax, Sulzer, and Valude still retain their connection with the *Annales*.

* * * *

A Badge of Office.

AT the last meeting of the President and Fellows of the Royal College of Physicians of Ireland, Dr. Charles E. FitzGerald, ex-President, asked permission to present to the College a badge to be worn by the President on ceremonial occasions. It was Dr. FitzGerald's wish to mark the fact that in selecting him as President the College had for the first time so honoured an ophthalmologist. The College received the gift with gratitude. The badge is of gold and enamel, displaying the arms of the College. The design was kindly supplied to Dr. FitzGerald by Captain Wilkinson, Ulster King of Arms.

* * * *

Quem Deus vult perdere prius dementat.

PROFESSOR JULIUS HIRSCHBERG, the eminent Berlin ophthalmologist, prefaces the August-September issue of the *Centralblatt für praktische Augenheilkunde* (which reached London when January was well advanced) with the following foreword:

"'FOR THE FATHERLAND.'

"Since the July number of the *Centralblatt* was despatched to subscribers, at home and abroad, the fearful war has broken out, wickedly forced upon us by our enemies."

THE OPHTHALMOSCOPE DIARY.

1915.

Royal Society of Medicine: Section of Ophthalmology	March 3rd	1, Wimpole Street, London, W.
Ophthalmological Society of the United Kingdom	April 22nd, 23rd, and 24th	London.
Royal Society of Medicine: Section of Ophthalmology	June 9th	1, Wimpole Street, London, W.
American Ophthalmological Society	July 6th & 7th	New London, Conn.
Oxford Ophthalmological Congress	July 15th & 16th	Keble College, Oxford.

THE
OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. XIII.—No. 4.] *APRIL 1, 1915.* [TWO SHILLINGS

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ORIGINAL COMMUNICATIONS.

GLAUCOMA AND THE BLOOD PRESSURE.

BY

ALEXANDER MACRAE, M.A., M.D.,

SHEIKH-OTHMAN, ADEN.

SINCE the days of v. Hippel and Adamuk (1869) it has been held that changes in the blood pressure affect the intra-ocular tension, a rise in the former being followed by a rise in the latter.

In more recent times experiments by Henderson and Starling[1] confirmed this observation generally.

It was a natural assumption to make from these experiments on animals that in glaucoma—the human disease in which increase in intra-ocular pressure is the outstanding phenomenon—there was likely to be found abnormally high blood pressure. Several observers have investigated this point clinically. In 1898 Terson and Campos[2] used Potain's sphygmomanometer in studying a series of glaucoma cases. They found, however, as most of their successors have found, that many glaucoma cases have not a high blood pressure, and that extreme degrees of glaucoma may co-exist with normal blood pressure. They accordingly refuse to associate themselves with any theory that high blood pressure has a causal connection with glaucoma.

Joseph[3], on the other hand, working with the same instrument in 1904, found high blood pressure in eighteen cases of glaucoma, and concludes that blood pressure must play an important part in glaucoma. Unfortunately, Potain's sphygmomanometer, which these observers employed, is now known to be quite an untrustworthy instrument for comparative work[4], a fact which may explain the conflicting results of these early investigators.

The same criticism applies to the work of another observer, Bajardi[5], who found high blood pressure in about 50 per cent. of his 56 glaucoma cases. The apparatus he used was the Riva Rocci, with the narrow armlet at first supplied with the instrument. Bajardi published his paper in 1900, and in the following year v. Recklinghausen proved that, for accurate results, a broad armlet was necessary.

Frenkel[6] in 1906 was the first to study control cases along with his cases of glaucoma. His work was done with Laulanie's apparatus, which he describes. He found the average pressure in fifteen glaucoma cases much higher than in his 35 control cases.

Laquiez, a pupil of Frenkel, after a study of nineteen cases of glaucoma, came to the conclusion that arterial over-pressure is found in every form of glaucoma. The same may be said of any disease of the middle-aged. It is just as true to say that in every form of glaucoma there are cases *without* high blood pressure. I have not seen Laquiez's paper, nor do I know what apparatus he used.

Krämer[7], in an able paper, published in 1910, discusses the whole subject. He examined 54 cases of glaucoma and found blood pressure higher than normal in 35 per cent. and lower than normal in 15 per cent. In a series of controls the relative proportions were practically identical, while a series of medical cases of high blood pressure showed no tendency to high intra-ocular pressure, as measured by the tonometer of Schiötz.*

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* Krämer makes the curious mistake of ascribing the pulsations of the tonometer lever to the pulse of the observer. Any one who takes the trouble to fix a tonometer by its collar to a mechanical support, which can be lowered till the instrument rests on the patient's eye, will find that pulsations of the lever are still present, although the observer is no longer in contact with the instrument. This proves that the pulsations are due to the pulse of the patient.

Krämer used Tauber's instrument, a modification of Gärtner's, for the measurement of the blood pressure. This instrument has disadvantages, but may be taken as fairly accurate.

Kümmell[8], in 1911, used the Riva Rocci apparatus with the broad cuff, which is recognised as being perhaps the best form of sphygmomanometer we possess up to the present. He examined twenty cases of glaucoma and 90 control cases, and found the average blood pressure much higher in the former, his result being in striking contrast to Krämer's.

Kümmell makes the justifiable criticism of Krämer's work, that his control cases were cataracts, and that cataract is a disease of a relatively later time of life than glaucoma. To get over this objection, one may adopt the method of studying the cases in decades. The following table gives the cases of Krämer and Kümmell arranged in this manner. I have omitted Kümmell's cases of hæmorrhagic glaucoma, as it is so difficult to tell whether these cases should be called primary or secondary; and also other cases of secondary glaucoma.

Age Period.	Average blood pressure.		Observer.	Glaucoma pressure	
	Glaucoma cases.	Controls.		Higher by	Lower by
40-49	103 (8)	111 (8)	Krämer	—	8 mm.
	160 (6)	134 (18)	Kümmell	26 mm.	—
50-59	119 (15)	110 (18)	Krämer	9 mm.	—
	186 (4)	141 (24)	Kümmell	45 mm	—
60-69	116 (15)	112 (36)	Krämer	4 mm.	—
	168 (8)	150 (26)	Kümmell	18 mm.	—
70-79	115 (3)	108 (23)	Krämer	7 mm.	—
	148 (3)	159 (16)	Kümmell	—	11 mm.

(The number of cases examined is given in brackets.)

Arranged thus the statistics show that in three out of the four decades each observer finds his glaucoma cases to have the higher average blood-pressure, while in the fourth decade (40-49 in Krämer's case, 70-79 in Kümmell's) the control cases have the higher average blood pressure.

There are, however, important differences between the two sets of figures. Krämer's figures are relatively low—Gärtner's instrument giving a lower reading than the Riva Rocci—but the point to notice is the smallness of the difference between the average pressure in his glaucoma cases and his controls. In no age-period is it more than 9 mm. On the other hand, Kümmel finds enormous differences between the average pressures, reaching at the period 50-59 to no less than 45 mm. Hg—the glaucoma cases having the higher value.

Taking the two sets of figures together, it is impossible not to agree that they establish the possibility, although by no means the certainty, that if a sufficiently large number of cases were examined to place the question beyond doubt, it would be found that the glaucoma patient had, on an average, a blood pressure higher than his non-glaucomatous coeval.

In order to bring the question, if possible, nearer solution, I have studied a series of cases of which notes are given below.

The patients examined were out-patients at the Eye Clinique of Dr. George Mackay, and later of Dr. J. V. Paterson, in the Royal Infirmary, Edinburgh. Numerous glaucoma cases were also seen in the wards and elsewhere, but it was found that rest in bed soon produced a considerable lowering of blood pressure in most patients, so that these cases could not fairly be compared with out-patients.

In work of this kind it is essential that, as far as possible, the patients should be examined at the same time of day, at approximately the same interval after food, and in similar psychological conditions, as all these points have a bearing on the blood pressure. Out-patient work is not ideal, but it was the only way of examining a sufficiently large number of cases, and it satisfies the conditions with regard to food, &c., fairly well. The apparatus used was Martin's modification of the Riva Rocci. Patients were examined on the table. At least three estimations were taken of the blood pressure, the lowest figure being recorded in each case. The method adopted was to increase the pressure in the armlet until the radial pulse could no longer be felt. The point at which the pulse reappeared on lowering the pressure was taken as the systolic reading. In all the glaucoma cases and in many of the controls the eye-pressures were also taken with Schiötz's tonometer.

In the glaucoma series only cases of primary glaucoma were taken, and no cases of secondary glaucoma were included in the controls. It is a moot point into which category secondary glaucoma should come, and it was thought better to omit such cases altogether. Apart from this reservation, the control cases were not selected in any way. The following are the cases :—

Cases of Primary Glaucoma.

No.	Age.	Sex.	Blood pressure.	Variety of Glaucoma.
1.	69	F.	220	Sub-acute.
2.	68	M.	200	Sub-acute.
3.	67	M.	170	Sub-acute.
4.	65	M.	132	Chronic.
5.	65	M	150	Chronic.
6.	65	F.	128	Chronic.
7.	64	F.	134	Sub-acute.
8.	63	M.	122	Chronic.
9.	62	M.	168	Sub-acute.
10.	61	M.	120	Sub-acute.
11.	57	M.	148	Chronic.
12.	56	M.	172	Chronic.
13.	56	F.	150	Chronic.
14.	52	M.	122	Chronic.
15.	48	M.	118	Chronic.
16.	46	F.	172	Acute following chronic.
17.	45	M.	138	Chronic.
18.	45	F.	142	Chronic.
19.	44	F.	150	Sub-acute.
20.	44	F.	122	Chronic.

Note.—Two cases were 70 were omitted because it was found impossible to get a sufficient number of control cases of that age.

Control Cases.

No	Age.	Sex.	Blood pressure.	Disease.
1.	69	F.	140	Cataract.
2.	69	M.	120	Embolism of central artery
3.	68	F.	160	Vitreous opacities.
4.	67	F.	148	Conjunctivitis.
5.	66	M.	200	Double optic neuritis.
6.	66	M.	144	Paralytic diplopia.
7.	65	M.	168	Cataract.
8.	65	M.	164	Cataract.
9.	64	M.	180	Corneal ulcer.
10.	63	F.	185	Myopia and early cataract.
11.	63	F.	148	Cataract.
12.	63	M.	136	Injury.
13.	62	M.	148	Cataract and high myopia.
14.	62	M.	142	Corneal ulcer.
15	[illegible]	M	178	Injury.
16.	[illegible]	M.	140	Injury.

No.	Age.	Sex.	Blood pressure.	Disease.
17.	60	F.	210	Cataract.
18.	60	M.	160	Hypermetropia.
19.	60	M.	192	Cataract.
20.	60	M.	140	Cataract.
21.	60	M.	142	Cataract.
22.	59	M.	168	Cataract.
23.	59	M.	138	Cataract.
24.	58	F.	208	Detachment of retina.
25.	58	M.	160	Presbyopia.
26.	58	M.	196	Cataract.
27.	57	F.	178	Cataract.
28.	57	F.	150	Irido-cyclitis.
29.	57	F.	180	Dacryo-cystitis.
30.	56	M.	148	Cataract.
31.	56	M.	144	Corneal ulcer.
32.	56	M.	126	Detachment of retina.
33.	55	F.	212	Sub-hyaloid hæmorrhage.
34.	55	M.	168	Cataract.
35.	54	F.	148	Hypermetropia.
36.	54	M.	140	High myopia.
37.	53	M.	145	Amblyopia following hæmatemesis
38.	53	M.	174	Hypermetropia.
39.	53	M.	168	Hemianopsia.
40.	53	M.	200	Injury.
41.	52	F.	152	Cataract.
42.	52	F.	210	Chalazion.
43.	51	M.	145	Injury.
44.	50	F.	150	Presbyopia.
45.	50	F.	154	Presbyopia.
46.	50	F.	140	Cataract.
47.	50	F.	116	Myopia.
48.	50	M.	120	Optic atrophy.
49.	50	M.	148	Injury.
50.	50	M.	158	Refractive error.
51.	49	F.	180	Choroiditis.
52.	49	M.	138	Injury.
53.	48	F.	112	Myopia.
54.	48	F.	132	Refractive error.
55.	48	F.	148	Hypermetropia.
56.	48	M.	140	Myopia.
57.	48	M.	138	Toxic amblyopia.
58.	47	F.	144	Refractive error.
59.	47	F.	110	Myopia.
60.	47	M.	134	Injury.
61.	46	M.	162	Cataract.
62.	46	M.	124	Amblyopia following injury.
63.	46	M.	138	Myopia.
64.	46	M.	120	Myopia.
65.	45	F.	138	Presbyopia.
66.	45	M.	140	High myopia.
67.	45	M.	118	Nystagmus.
68.	42	F.	142	Hypermetropia.
69.	42	F.	120	Astigmatism.
70.	42	F.	102	Iritis.
71.	42	F.	128	Cataract.

Arranging these figures in decades one gets the following results:—

Age-period.	Average blood-pressure.		Glaucoma pressure	
	Glaucoma cases.	Controls.	Higher by	Lower by
40 49	140 (6)	134 (21)	6 mm. Hg.	-
50 59	148 (4)	160 (29)	—	12 mm
60 69	154 (10)	159 (21)	—	5

(No. of cases examined in brackets.)

So that, like those both of Krämer and Kümmell, my results are not uniformly either in favour of or against the theory that the average blood pressure in glaucoma is high. But while their figures tend on the whole to favour the theory, mine, on the other hand, tend to oppose it ; as at only one age-period was the average blood pressure of the glaucomatous in my series higher than that of the controls.

In studying these figures, one is met at once by the difficulty that occasionally, both in glaucomatous and non-glaucomatous patients, one finds evidence of kidney and arterial disease with very high blood pressure. One must include such cases in the glaucoma series—it would be begging the question to exclude them ; and obviously it would be unfair to exclude them from the controls. Yet one or two such cases in either series may easily alter the whole complexion of one's results. For instance, in the 40-49 decade one of my glaucoma patients had a blood pressure of 172. Had that patient not happened to be examined there would have been only five glaucoma patients at that age-period, and their average pressure would have been 133, *i.e.*, less than that of the controls. This would have given the controls in each of the three age periods the higher average pressure, and one might easily have thought that a strong case had been established against the idea of there being a high average blood pressure in the glaucomatous.

To eliminate this factor of chance, it is necessary to deal with large numbers; the larger they are the nearer one will be to the truth. But glaucoma is a comparatively rare disease in Scotland, and the accumulation of a mass of statistics sufficiently large to eliminate the possibility of error would be a lengthened process.* The question suggests itself : is such research worth while?

In reviewing the work of my predecessors, I have criticised the various forms of sphygmomanometer employed. The Riva Rocci is believed to be the best in use at present. But even it is open to criticism. For years a strong controversy has been going on as to the meaning of its readings. There are many who hold that it gives the actual blood pressure in the brachial artery. On the other hand, there is a strong school, of which Russell, of Edinburgh, is the protagonist, which holds that the condition of the artery wall is by no means a negligible factor. According to these investigators, what one measures with the Riva Rocci type of apparatus is the blood pressure *plus* the resistance of the artery to obliteration of its lumen ; and this latter resistance, they hold, may form no inconsiderable part of the reading. As it is impossible to say how much of the total reading is due to the blood pressure alone, it is claimed that no certain method exists of testing the blood pressure clinically. The impression is gaining ground that this view of Russell's is correct. And as it is in patients of the ages at which glaucoma occurs that this resistance of the artery wall becomes an important factor in the sphygmomanometer reading, we must wait until an instrument has been invented which can eliminate this factor before we can settle the problem with which this paper has been concerned.

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* Craggs and Taylor, of Madras, where large numbers of cases are available, have published in THE OPHTHALMOSCOPE, in June, 1913, a synopsis of an investigation of a similar kind. They found in 75 cases each of cataract and glaucoma that the average blood pressures were 144 and 142 respectively. They average the age of their two classes of patients as 53 and 49 respectively.

I have been deterred from attempting work of this kind in Arabia by the impossibility of getting anything but a wild approximation to the ages of patients. I fancy there is the same difficulty in India, and that a study of cases in decades, which I believe to be the only satisfactory method, is impossible, because patients do not know their ages.

Meanwhile the evidence so far accumulated on the question of the relation between the blood pressure and the intra-ocular tension may be reviewed.

Henderson and Starling's experiments have been already referred to.

In the interminable literature of glaucoma there are numerous scattered references which seem to point to the importance of the blood pressure in glaucoma. Dunn[9] and Jackson[10] have stated that in primary glaucoma they have invariably found blood pressure above normal. Observations of this nature are, however, of little value unless controlled by the examination of non-glaucomatous patients under similar conditions.

Fox's case of acute glaucoma[11] has been often quoted. The blood pressure was 265. A venesection of 20 ozs. reduced the blood pressure to 150, and allowed miotics, previously of no avail, to act on the pupil and reduce the intra-ocular pressure. Roun[12] tells of a patient whose blood pressure was 210 and eye tension +2. High frequency treatment reduced the blood pressure to 140, and the eye tension nearly to normal.

Gilbert[13] quotes cases of glaucoma in which the curves of eye pressure (taken by Schiötz's tonometer) and the blood pressure kept remarkably parallel, venesection of 3 g. per kilo weight of the patient reducing both pressures.

On the other hand, it must be noted that in Henderson and Starling's experiments the curves of eye and blood pressure were not always parallel. They found, for example, that stimulation of the Gasserian ganglion caused a lowering of eye tension without any change in the blood pressure.

Wesseley[14] in a series of experiments with intra-venous injections of adrenaline, found that the resultant effects on blood pressure and intra-ocular pressure were inconstant. In some cases both pressures rose together ; in others one rose, while the other remained stationary or sank.

The same observer found on stimulating the cervical sympathetic, that the intra-ocular pressure decreased by about one-third, while no change occurred in the blood pressure.

The venesection cases are also open to the objection, which Gilbert himself admits, that the mere withdrawal of the relatively small quantity of blood is not in itself sufficient mechanically to cause the fall in blood pressure. The resulting reduction of blood pressure may be due to a change in metabolism set up by the small loss of blood, and the same change, and not the reduced blood pressure, may be the agent in affecting the intra-ocular tension.

In order to see whether it was possible to find clinically any confirmation, in the human subject, of the relation between blood pressure and eye pressure which Henderson and Starling found in animals the following experiments were performed :—

The pressures of three young patients, of an age at which the Riva Rocci may be presumed to give the genuine blood pressure, were taken. They were then directed to take a short period of violent exercise—running up and down stairs—in order to cause a heightening of blood pressure. On their return the pressures were taken again.

With regard to the eye pressure it must be remembered that with Schiötz's tonometer there is, in normal eyes,* a lowering of the readings under successive applications of the tonometer. This lowering does not go on indefinitely, from 2 to 6 mm. of a drop being the ordinary limits with four or five applications of the tonometer. After a few minutes' rest, the eye tension returns to the original height. The following are the notes of the cases :—

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* In the glaucomatous this lowering of pressure under tonometry is frequently very small or absent, while occasionally one actually finds the later readings higher than those first taken.

Case I.—J. M., *æt.* 32, male. Disease: Sarcoma of left orbit. Blood pressure, 112. Eye tension, 9 mm. After exercise, blood pressure had risen to 130 and the eye tension was 10 mm.—a rise of 1 mm., which, of course, is quite within the limits of error of the tonometer. The same patient was examined a week later and his blood pressure was 100, eye tension 12, dropping under tonometry to 8½. After exercise, the blood pressure was 130, while the eye tension was 7½-7.

Case II.—A. d'A., *æt.* 22, female. Disease: Retro-bulbar neuritis of right eye. Blood pressure, 112; tension of left eye, 14½, After exercise, blood pressure had risen to 132, but the effect of the holocaine had worn off and the eye tension could not be taken. Holocaine was again instilled and the patient sent off for further exercise. On return, the blood pressure was 132, eye tension—six minutes after the previous test—was 14½, its original height.

Case III.—M. C., *æt.* 14, female. Disease: Lupus vulgaris. Blood pressure, 114; eye tension, 18. After exercise, the blood pressure had risen to 140, while the eye tension had fallen to 14½.

From these notes it will be seen that while in each case blood pressure was considerably heightened by exercise, in only one patient was there any heightening of eye tension In that case the rise of tension found was only 1 mm. Hg. On repeating the experiment the following week in the same patient, the opposite effect was found, the eye tension on this occasion having diminished by 1 mm. In another patient, the eye tension before and after exercise was identical; while in the third, the tension after exercise proved to be considerably lower than before.

These experiments lend no countenance to the view that the eye pressure in man alters with the blood pressure. It is true there may have been a heightening of the eye tension during the minute or two which elapsed while the patients were taking exercise. There is nothing to prove that there was, and certainly by the time they had returned to the examining table there was no increase in the eye tension discernible.

With these results we may compare the experiments of Hertel[15] on rabbits. Hertel introduced solutions of various salts direct into a vein, and watched the effect on blood pressure and intra-ocular pressure. One or two of his cases may be quoted:—Case IV. Rabbit weighing 2,300 g. Infusion of 10 per cent. NaCl into a vein. The infusion began at 11.32 a.m., at which moment the eye tension was 28 mm. Hg. (Schiötz) and the blood pressure, measured by a canula in an artery, 124 mm. By 11.41, 15 cc. of the salt solution had been injected, the blood pressure was 122-126, while the eye tension had fallen to 12 mm. Three minutes later, by which time 21 cc. of solution had been introduced, the eye tension was 0. Blood pressure was 124 as before. Case V. Rabbit weighing 2,015 g. Eye tension 26.5, blood pressure 119 A quarter of an hour later, by which time 30 cc. of solution had been injected, the eye was pulpy, while the blood pressure was 118. Hertel's results show that the eye tension can be altered enormously in each direction without any alteration of blood pressure by merely altering the strength of the solution introduced into the blood-stream. If the amount injected was less than .009 g. per minute and kilo of body weight, the result was an increase of intra-ocular tension, the same result being obtained by injection of plain water; while, if the solution injected represented more than .025 g. per k. and m., the result was a lowering of the eye tension. In no case had the solution injected any noticeable effect on the blood pressure.

Fischer[16] experimenting with enucleated eyes, found that the thick tunics of an ox's eyes were burst by the enormous intra-ocular pressure induced by merely placing the eye in a weak solution of acid.

These experiments, considered along with the other points brought forward here, suggest that an altogether exaggerated importance has been given to the blood pressure as a factor in maintaining or increasing eye tension. That it does help to maintain the eye tension no one will deny. But the eye tension may be affected in many ways, which have no connection with, and no effect on, blood pressure ; and conversely the blood pressure may alter greatly without any corresponding effect on eye tension being observable. That blood pressure is of any importance at all in the causation of glaucoma is very doubtful. It is at least likely that the solution of the long-standing problem of the ætiology of that disease may prove to be a chemical one, with the well-known phenomenon of osmosis as its basis.

Hill's theory[17] of a local toxæmia, bacterial or otherwise, producing chemical changes in the colloids of the eye, which cause them to absorb water, seems to me to meet every factor in the case. It is a theory which need invoke no help from the blood pressure.

I have much pleasure in acknowledging my indebtedness to Dr. Mackay, who has throughout taken a great interest in my work, and who generously placed his excellent library of ophthalmic literature at my disposal, and to Dr. Paterson, at whose suggestion the research was first undertaken. Both surgeons were most kind in affording me every opportunity of examining cases under their care.

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A CASE OF DESTRUCTION OF CORTICAL VISUAL CENTRES BY A RIFLE BULLET.

BY

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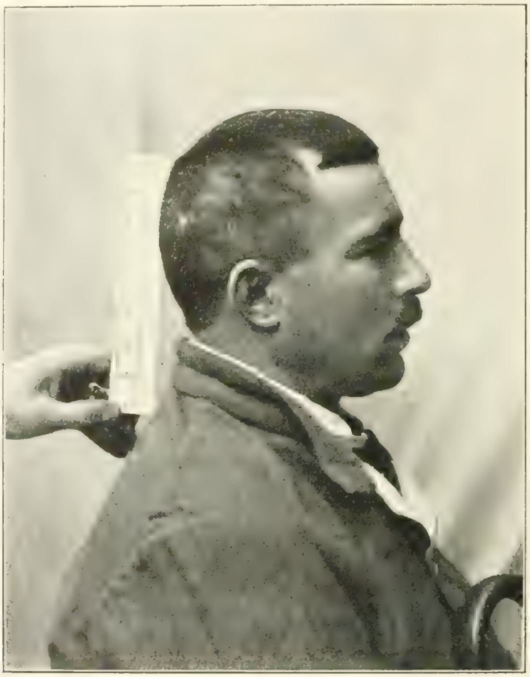
LIEUT. R.A.M.C. (S.R.).

Case.

Alfred M., *æt.* 34, on October 23rd, 1914, while in the firing line in the neighbourhood of Ypres, was shot through the back of the head, doubtless with a rifle bullet, as there was no shell fire going on at the time. For nine days he was unconscious, lying in a base hospital at Boulogne. Upon regaining consciousness, he was unable to see anything beyond distinguishing light from dark, or coarse hand movements.

On November 15th he was transferred to the Connaught Hospital, Aldershot, and came under my observation. Vision remained at perception of hand movements. The pupils were vigorous in their reaction to light, both by consensual and direct stimulation; in a room well lighted by daylight the pupils were 2·5 mm. in diameter, and retained well the contraction produced by direct or consensual stimulation. The reactions to convergence and accommodation were, however, very poor, although demonstrable. The media presented nothing calling for remark. The optic discs displayed a slight indistinctness of the margins, more pronounced over the upper one-third of the circumference. The surface of the papillæ was hyperæmic, the arteries and veins being of normal calibre. One assumed that the condition was that of a slight reaction of the head of the optic nerves. The maculæ were healthy.

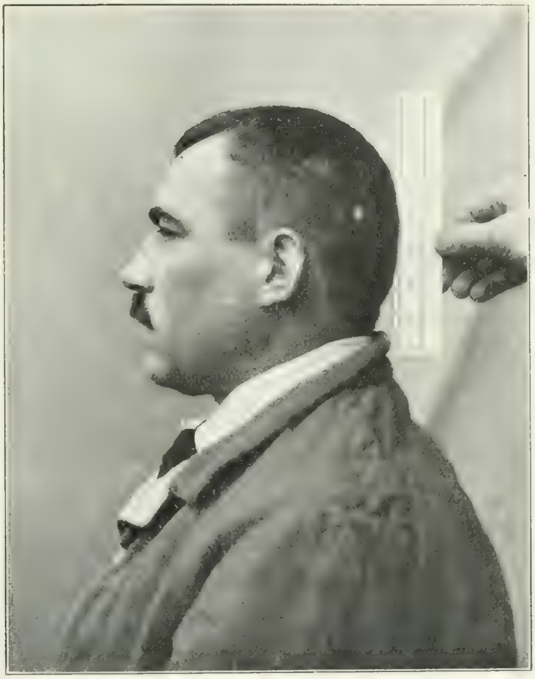


The general condition of the patient was excellent. He was cheerful, suffered from no headache, had no vomiting, and gait was unaffected; knee jerks present; no Romberg. He was able to describe the action in which he had taken part and had no loss of memory of his previous home surroundings or of his late military life. As far as can be determined, he suffered no loss of his higher association centres and their functions.

I have examined the case at frequent intervals over a period of three months; that is, to a period some four months subsequent to the injury. Vision has remained absolutely stationary, there has been no loss of his perception of hand movements when intercepting a bright light, and, on the other hand, there has been no suggestion of improvement. The general condition has remained in every way satisfactory. In the fundi there has been no appreciable change; at times I have thought that a slight pallor was becoming distinguishable, but at the latest examination I agreed that the colour was in no manner altered from that of the first examination. The pupillary reactions are, too, in *statu quo.*

Remarks.

It may be reasonable to presume that the passage of a bullet through the brain substance would scarcely suffice to destroy completely both visual centres, unless these centres are very circumscribed. It is established by the character of the entrance and exit wounds (see Figs.) that the bullet was not flattened or in any way thrown out of its proper axis of trajectory. Any coarse tearing or destruction of the brain other than the ordinary flesh-wound, puncture type of lesion can therefore be eliminated. Nor has the bullet wounded absolutely corresponding areas of each hemisphere, as its direction is not perfectly transverse to the sagittal suture, being backwards and upwards, if the left wound be regarded as that of entrance. In most cases of cortical hemianopia reported, the cortical lesion has been found to be associated with some involvement of the optic radiations. Beevor and Collier (1904) have shown that the whole of the cortex of the calcarine fissure may be destroyed, as well as a large portion, 2 cm., of the falciform lobe, the lingual lobe from the junction of the calcarine and parieto-occipital fissures, and the greater part of the inferior cuneal gyrus, with the production only of quadrantic hemianopsy of the upper part of the opposite visual fields.



But although the calcarine area may be the primary half-vision centre, it is obvious, from experimental and pathological data, that it does not constitute the whole of the visual sphere. The atrophy which occurs from long-standing blindness or anophthalmos does not limit itself to the region of the line of gennari, but affects also, as von Monakow has found, the whole of the occipital gyri, as well as the angular gyri, in part, at least.

Ferrier, Vialet, von Monakow, and Turner agree that the optic radiations have a much more extensive distribution than the walls of the calcarine fissure. A considerable portion, the middle stratum, pass to the calcarine fissure; an inferior layer can be traced to the lingual and fusiform lobules, and a superior layer to the angular gyrus and convex aspect of the occipital lobe. The visual sphere must, therefore, embrace not merely the calcarine area, but the whole of the occipito-angular region.*

The same author, Ferrier, agrees that the macula is innervated from both cerebral hemispheres, stating that in double hemianopsia (successive lesion in each hemisphere) central vision is retained and may be nearly normal, and not associated with word-blindness or alexia. In the case of Beevor and Collier, although the whole of the calcarine fissure was destroyed, central vision was retained. "It is obvious, therefore, that central vision is not represented in the calcarine area. Central vision, however, is always markedly affected in visual agnosia due to bilateral lesions of the occipito-angular convolutions." Ferrier maintains that central vision is represented in the angular gyri.

The present case would agree with Ferrier's citations by supposing that the angular gyri were injured either by the direct passage of the bullet, by hæmorrhage, by compression of fractured bone, or callus formation. Doubtless, the cortex in the neighbourhood of the calcarine fissure has also been traversed by the bullet. Although the injury to the parietal bones appears to be solely that associated with a clean-cut bullet wound, there may be more extensive fracturing, particularly of the inner table; therefore, too much reliance must not be placed upon this being a case of anopsia solely due to the passage of the bullet through the cerebral tissue.

The exact positions of the scalp wounds (see Figs.) are:—

Right side: 5¾ inches posterior to the outer boundary of the orbital margin, on a line 1½ inches horizontally posterior to the tip of the mastoid process, and 3½ inches superior to that point.

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* These statements are quoted almost *verbatim* from the article by David Ferrier, in Allbutt and Rolleston's "System of Medicine," Vol. VIII, p. 80.

Left side: 5½ inches, 1¼ inches, 3 inches, upon the same lines as those above mentioned for the right side.

The interval between the two wounds, 5½ inches.

CLINICAL MEMORANDA.

OPHTHALMOPLEGIA INTERNA CAUSED BY EXPOSURE TO ULTRA-VIOLET RAYS.

BY

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THE patient, a young man acting as assistant in a physical laboratory, was experimenting with an ultra-violet ray lamp, and immediately afterwards noticing that the pupil of his right eye was dilated, came to me. I found the pupil fully dilated and accommodation paralysed. Under treatment with eserine he recovered fully in about a week.

I cannot find any reference to this cause of ophthalmoplegia in any of the text-books at my disposal.

A CASE OF SYMPATHETIC OPHTHALMITIS TREATED WITH TUBERCULIN.—RECOVERY.

BY

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Case.

THE patient, T.M., a delicate, fair-haired girl, four years of age, came to the Durham County and Sunderland Eye Infirmary on the 23rd of October, 1913. She then had a large sloughy ulcer of the right cornea which had recently perforated. The left eye appeared to be healthy. From the mother's statement, the trouble in the right eye appeared to have started about the 6th of October as an ordinary phlyctenular conjunctivitis and keratitis.

The child was admitted to the wards under the care of Dr. W. H. Maling.

Under treatment, the eye gradually quietened down, and the patient was discharged on the 18th December, 1913, with instructions to attend as an out-patient. The right eye was then quite free from inflammation, but there was a large adherent leucoma and practically no anterior chamber. The left eye was apparently healthy.

On the 22nd of December the child came to the out-patient department for some medicine, when I noticed a slight injection of the ciliary vessels in the corneo-scleral region of the *left* eye. On closer examination, I found that the light reflex of the iris was sluggish, and the ophthalmoscope revealed a few dots on Descemet's membrane and one small posterior synechia.

The patient was re-admitted to the wards, and the right eye was enucleated the same day. She was ordered 10 grains of sodium salicylate with 10 grs. of sodium bicarbonate every four hours and daily inunctions of mercury. Locally, atropine and dionin drops were instilled and frequent hot bathings were given.

At first the synechia broke away and the pupil dilated perfectly, but the disease quickly manifested itself as an unmistakable sympathetic ophthalmitis. The aqueous became turbid, the iris presented a muddy appearance, and there was a well-marked triangular-shaped precipitate on Descemet's membrane (so-called keratitis punctata), whilst the eye had the dull, sluggish look so characteristic of sympathetic disease.

In spite of the vigorous use of strong mydriatics, we had the utmost difficulty in keeping the pupil dilated. Sometimes the eye appeared to be better, but the improvement was always followed by a relapse within a day or two. Gradually, the pigment at the margin of the iris increased in amount, a greyish exudate was deposited on the capsule of the lens, and the margin of the pupil became "fuzzy" with minute synechiæ.

By the end of January I felt certain the eye was doomed, and, as a last resort, asked Dr. Maling if I might try tuberculin. On 2nd February, 1914, the patient was given a subcutaneous injection of one ten-thousandth mg. of T.R., and the dose was doubled each week until it reached one-fiftieth mg. Within a fortnight of the first injection, the condition of the eye began to improve, and no further relapse occurred. Gradually, the aqueous became less turbid and the iris lost its muddy appearance; the congestion subsided and the precipitates on Descemet's membrane became absorbed. The salicylate mixture was given, except for a day's rest now and then, during the whole period the child was in Hospital.

On May 18th, when the patient was discharged to the out-patient department, to a casual observer, the eye looked perfectly normal, the original colour of the iris having been restored. On closer examination, one saw that there was an annular posterior synechia, and that the pupil was fixed at 5 mm. On the capsule of the lens there were a few minute dots of iris pigment and some traces of exudate.

Weekly injections of one-fiftieth mg. of T.R. were continued until August 27th, 1914, and atropine and dionin drops were instilled from time to time.

Present Condition (January 25th, 1915).—The pupil measures 5·5 mm. The anterior layers of the iris respond definitely to the action of light in spite of the condition of annular posterior synechia. There is no sign of *iris bombé*. The media are perfectly clear, and the fundus is well seen. In the choroid there are two or three small white patches surrounded by a border of pigment and situated about two disc diameters to the outer side of the macula. Retinoscopy reveals mixed astigmatism. With a correcting glass of + 1D. sph. $\bigcirc$ — 3. D. cyl. axis 50° the visual acuity is 6/10ths easily (8/10ths doubtfully).

Observations.

There was no preliminary stage of sympathetic irritation.

It must be very unusual for a case of perforating corneal ulcer to be followed by sympathetic ophthalmia.

The question of performing an iridectomy in the near future is one of extreme importance and of considerable anxiety.

This tragic disease is uncommon in this part of the world, hence it may (and I hope will) be a long while before we have further opportunity of testing the value of tuberculin. I feel it my duty to publish the case in the hope that others may give tuberculin a trial, and that the results will be equally happy.

It would be absurd to attempt to draw conclusions from a single case, but one cannot help speculating as to the part played by the tuberculin. At the Durham County and Sunderland Eye Infirmary we have given several thousand tuberculin injections during the last three years, and the results have been exceedingly good in strumous cases of phlyctenular conjunctivitis and keratitis and of blepharitis. One cannot imagine that the tubercle bacillus is at work locally in all, or even in the majority, of the cases. Struma has been well defined as "an abnormal vulnerability of the tissues," and we may suppose that these children are in a state of abnormal vulnerability as a result of absorption from tuberculous foci in some part of the body, such as the cervical, bronchial, or mesenteric glands. Under tuberculin treatment their general condition is markedly improved and the eye disease becomes readily amenable to local treatment.

Possibly, the action was similar in the above case of sympathetic disease. The family history was not good,* and the child had a few enlarged cervical glands, but I was unable to find any definite evidence of active tuberculosis. Similarly, one might explain the good results obtained by salvarsan in sympathetic ophthalmia on the grounds that the patient had a syphilitic taint and that the salvarsan increased his general resistance. On this assumption one should be guided by the patient's previous history in deciding whether to use tuberculin or salvarsan in sympathetic disease.

Personally, I believe the action of the tuberculin to have been specific rather than general. The close resemblance to tuberculous nodules of the lesions found in sympathetic disease, the chronic proliferation and infiltration, the focal collections of epithelioid and giant cells, are, to my mind, very suggestive. Although the tubercle bacillus has never been found in the lesions, it may be that the latter are caused by an aberrant form of this or of some closely allied organism.

In conclusion, I must acknowledge my indebtedness to Dr. W. H. Maling, for kindly allowing me to publish the case.

Method of giving Tuberculin.

At the Durham County and Sunderland Eye Infirmary our method of giving tuberculin is as follows.—We obtain, from Messrs. Allen & Hanbury, sterile *azoules*, each containing one mg. of T.R. The contents (about 20 minims) of an *azoule* are withdrawn by means of a sterile hypodermic syringe, and are diluted to 100 minims with a sterile 5 per cent. solution of glycerine in distilled water. This solution, now containing one mg. of T.R. in 100 minims, is placed in a sterile stoppered bottle labelled "A." Ten minims from bottle "A" are then diluted to 100 minims, with 5 per cent. glycerine solution, and placed in bottle "B"; ten minims from bottle "B" are next diluted to 100 minims and placed in bottle "C," and, finally, ten minims from bottle "C" are diluted to 100 minims and placed in bottle "D." From these bottles any required dose can be withdrawn, by means of a sterile syringe. A fresh supply is made up once a week.

The secret of success, undoubtedly, lies in avoiding a focal reaction, and I have ultimately arrived at the following system of dosage in order to achieve satisfactorily that end.

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* Father and two sisters died of consumption.

The initial dose is ten minims from bottle "D"; *i.e.*, one ten-thousandth of a mg. of T.R. An injection is given once a week, so that in thirteen weeks a dose of one-fifth of a mg. is reached by the following gradual stages:

10 minims from bottle D = 1/10,000th mg. T.R.
20 ,, ,, ,, D = 1/5,000th ,, ,,
4 ,, ,, ,, C = 1/2,500th ,, ,,
8 ,, ,, ,, C = 1/1,250th ,, ,,
10 ,, ,, ,, C = 1/1,000th ,, ,,
20 ,, ,, ,, C = 1/500th ,, ,,
4 ,, ,, ,, B = 1/250th ,, ,,
8 ,, ,, ,, B = 1/125th ,, ,,
10 ,, ,, ,, B = 1/100th ,, ,,
20 ,, ,, ,, B = 1/50th ,, ,,
4 ,, ,, ,, A = 1/25th ,, ,,
8 ,, ,, ,, A = 2/25ths ,, ,,
10 ,, ,, ,, A = 1/10th ,, ,,
20 ,, ,, ,, A = 1/5th ,, ,,

Nearly all our cases of phlyctenulosis are given the above course of treatment as a matter of routine. The injections are made by a nurse, subcutaneously in the deltoid region, the skin having been previously cleansed with ether soap. Out of several thousand injections there has been no case of *general reaction*, there is frequently a small *local reaction*, and it is very rare indeed to obtain a *focal reaction*. When a focal reaction does occur, it is always very slight, but, as a precautionary measure, the dose of T.R. is repeated the next week instead of being increased.

The way in which these cases improve under tuberculin treatment is very remarkable, but the most satisfactory feature is their freedom from relapse.

REVIEW.

THE INTRA-OCULAR PRESSURE AND THE TENSION OF THE EYE.

BY

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PART I.

IT is not possible to take up the study of the source of the intra-ocular pressure without being profoundly struck by the wide divergence between the views of those who have recently written or spoken on the subject. Part of the confusion which has arisen would appear to be due to an avoidable vagueness in the use of terms, part to an attempt to argue the question on the basis of *schemata* which are not wholly apposite, and part to attempts to draw deductions before sufficient data are available. The present paper makes no claim to attain finality. It is merely an endeavour to straighten out the facts from the fictions which have gathered round them, whilst avoiding the temptation of being led to found dogmatic theories, where the present state of our knowledge does not appear ripe for such decisive treatment.

Terms.

It will clear the ground if we begin by defining some of the terms which are in constant use in this discussion.

*Pressure** is the force exerted by one body on another by its weight, or by the continued application of power, viewed as a measurable quantity, the amount being expressed by the weight upon a unit of area.

*Tension** a constrained condition of the particles of a body when subjected to forces acting in opposite directions away from each other, thus tending to draw them apart, balanced by forces of cohesion holding them together; the force or combination of forces acting in this way, especially as a measurable quantity (the opposite of compression or pressure).

In the light of the above definitions, we can discuss two terms which have often been confused with each other, and have consequently been used in the wrong sense, *viz.*, intra-ocular pressure, and ocular tension.

The *intra-ocular pressure* is the pressure (usually measured in mm. of Hg.), at which the intra-ocular fluid stands within the eye. It can only be measured by means of a manometer, and the readings obtained are easily vitiated by errors in experimental *technique*.

The *tension of an eye* is a measure of the state of tension of its tunic, and can be estimated either digitally or by means of a tonometer. Of the latter instruments the Schiötz is generally conceded to be the best. The tension of an eye is frequently confused with the intra-ocular pressure, and this confusion has been deepened by the fact that every effort has been made to ensure that the modern tonometer shall give a reading which as nearly as possible indicates the pressure of the fluid within the chambers of the eye. This pressure is, however, only one of several factors which go to make up the tension of the ocular tunic. The thickness and the distensibility of that tunic, the surface area of the organ, and possibly other factors as well, enter into the question.

*Elastic,** such as spontaneously resumes (after a longer or a shorter interval) its normal bulk or shape, after having been contracted, dilated, or distorted by external force.

Rigid (in physics), theoretically such as to resist change of form, when acted on by any force. (Annandale).

Closed, shut up, — inclosed. (Annandale). The meaning conveyed is that nothing can pass into or out of a box, sphere or other structure, which is said to be *closed*.

Filtering scar. This term has been used as though it were synonymous with the term fistulous scar. It seems desirable to separate the two in view of the opinion held by some ophthalmologists, that filtration may take place through a spongy cicatrix, in which no actual fistula can be found to exist. Without admitting that such a condition actually exists, yet in deference to the opinion of those who think differently (Herbert and others), and to save confusion in debate, it would be well to speak of a scar in which an actual fistula can be seen to be present, or is believed to be present, as a *fistulous scar*, whilst the term *filtering scar* is reserved for the condition (of the existence of which actual proof is wanting) in which the fluid is supposed to traverse a mass of spongy cicatricial tissue in order to reach the subconjunctival space. If this terminology is accepted, the escaping fluid should likewise be called *fistula* or *filtering* fluid, as the case might be.

Schemata. In reading the various discussions on the subject of the intra-ocular pressure, one is struck with the ingenuity which has been displayed in the efforts of writers to reduce the physical conditions they believe to be present to *schemata*, in the hope that they will thereby simplify the comprehension of the problems involved. Not less striking, if more diverting, is the uniformity with which each such *schema* is unhesitatingly rejected by another thinker. It is obvious that there are lessons to be learnt from a consideration of these phenomena. *Schemata* may obviously be of use, but it would appear that such use is very restricted. They may possibly help to clear up some doubtful point, but it would seem certain that little reliance can be placed on them for large deductions. Nor is this surprising, when we remember that there are physical and anatomical facts in connection with the eye which are still under dispute. Moreover, the exact reproduction of the complex conditions which enter into the make-up of even the dead eye, demands an expenditure of money, thought, labour, time, and skill, which is beyond the means of most, if not of any, experimenters. When on to this is grafted all that the phenomena of life imply, and we may mention amongst other things the behaviour of nerves and of muscular tissue under varying conditions, we find ourselves confronted with a situation which is enough to give pause even to the most enthusiastic.

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*The definition is from the New English Dictionary (Oxford).

The Physical Conditions Regulating the Intra-Ocular Pressure.

The eye has, in recent years, been not infrequently spoken of as "a closed sphere, with rigid walls, and of fixed contents"; and arguments as to its behaviour, under various conditions, have been built on the assumptions contained in the above description. It is, therefore, necessary to insist most strongly (1) that the eye is not a closed sphere, (2) that its walls are not rigid, and (3) that its contents vary in volume under conditions both of health and disease.

The eye is *not* a closed sphere. Fluid is freely entering it from without and is as freely leaving it from within. This fluid, be it observed, is not contained merely in the vessels of the organ, but passes out from those vessels into the cavities of the eye. From these cavities it passes back again into the vessels and so leaves the globe. This procession of fluid through the eye goes on throughout life, and if it stops or is interfered with, the health of the eye is at once endangered. It is therefore difficult to understand how anyone can entertain the view that the eye is a "closed sphere"; and it is obvious that any *schema* founded on such an assumption must be open to grave criticism.

The eye is *not* "a rigid sphere." Its walls are distinctly distensible and elastic. This is a very material point in all our considerations. We have no wish to use terms in any strained sense, and we take the definition already given of the word rigid, believing that it represents the sense in which it is usually employed in our language, *viz.*, theoretically such as to resist change of form, when acted on by any force.

The contents of the eye are *not* "fixed." On the contrary, we believe that they are constantly varying in volume, and that these variations in volume determine the degree of tension of the ocular tunic, as tested either by the fingers or by the tonometer.

At first sight, it would appear tempting to take up and discuss each of these headings separately, reviewing the evidence bearing on each in turn. Further consideration, however, shows that to do so would involve repetition and confusion, and it has therefore been resolved to group them all together. In doing so, we approach the subject from various and widely different points of view, for the topic has proved of interest to the physicist, to the physiologist, to the pathologist, and to the clinician.

(*a*) The difference in feel between various eyes is marked, even under the conditions of health; and when we come to deal with abnormal conditions, this difference is still more accentuated. In the healthy eye we feel a sense of elasticity or resiliency of the ball, such as we are accustomed to find in a moderately-distended rubber ball, *ex. gr.*, in a rather slack football or tennis ball. Under digital examination we can dimple its walls, and feel them spring back into place as soon as the force we exert is removed. If we now turn our attention to a globe which is shrinking under the influence of an attack of cyclitis, we find that it feels like a soft bag of fluid. Its coat is obviously not rigid, and its contents are not of the same volume as those of a normal eye. It may be answered that in such a case the alterations that have taken place in the tunic of the eye affect the proposition so far as the rigidity of that structure is concerned; but this argument will obviously have no bearing on the change in volume observed; nor, so far as the tunic is concerned, will it meet the case of an eye from which a large vitreous escape has taken place during the course of a cataract extraction; and yet the way in which such a globe collapses shows conclusively that its walls are not rigid. We shall find even more instructive the case of a hypotonic eye (with a Schiötz reading corresponding to a tension of 8 to 15 mm. of Hg.) such as may be met with after a trephining or other sclerectomy operation. Such a globe is closed to the outer surface, but fluid is passing freely from its interior through the breach in the scleral coat, into the sub-conjunctival space. It feels soft to fingers and the tonometer reading is low. Should the hole in the sclera fill up, the evidence of the passage of fluid from the inside of the eye into the sub-conjunctival space disappears, the eye hardens and the tonometer reading goes up. We shall return to this subject again shortly. For the moment we pass on to consider the feel of a high tension eye, such as that just described. The rise in tension may be so slight as to be inappreciable to finger estimation, or so great that the surgeon describes it being "as hard as stone." As we review these variations in the feel of a globe, ranging from flaccidity to stony hardness, what is the most natural explanation which presents itself to our minds? The obvious answer will be that the feel of the globe is an expression of the tension of its coat, and that the degree of that tension is largely determined in the instances before us by the volume of the fluid contents of the eye. In other words, the evidence of our senses, trained in the everyday actions of life, indicates clearly to us that when handling an eye, we are not dealing with a sphere which possesses a rigid wall, or with one with fixed contents.

(*b*) It is possible to carry the argument still farther by means of a simple experiment. If an eye is connected with a manometer, by means of a needle passed into the interior of the globe, the pressure within the globe can, by a simple arrangement, be made to vary at will, say from 5 mm. of Hg. up to 80 or more mm. From time to time during this process of raising the pressure, the tension of the globe can be taken with the fingers. If this is done, the eye is found to pass, as the pressure rises, from a soft bag of fluid to a hard tense sphere, varying just as we have shown it does under clinical conditions. We can, in fact, duplicate the changes in the feel of the globe with which our clinical experience has made us familiar. The globe obviously becomes tenser both to sight and feel, and it is evident that the increasing pressure is in part at least an expression of an increase in its fluid contents, of its passage, in fact, from a soft bag of fluid to a tensely filled sphere. In any case we can eliminate the pressure of the column of fluid as a causative factor, by shutting off the tap which connects the interior of the eye with the source of pressure, before making each observation. A point to be emphasised is that during the earlier stages the increase in volume of the contents of the eye is appreciable to the senses, whilst as will be shown later, the volume is still increasing, up, at least, to a point at which the pressure stands at 80 mm. of Hg.

(*c*) It has been suggested that the dimpling of a normal eye under digital manipulation is effected by the expulsion of a certain quantity of blood from within the globe, under the pressure of the fingers. It may be doubted whether a sufficient quantity of blood could be expelled in this way to give rise to the amount of dimpling one is familiar with. But even if it were possible to accept this explanation for the normal eye, how can we explain the fact that a high tension eye will not dimple at all under the fingers? Is it to be believed that the rise in the tension of the vessels feeding the eye from, say 25 mm. of Hg. to 80 mm., suffices to make the globe so hard that we cannot dimple it, or that we can do so only by exercising considerable and (clinically) unjustifiable pressure. It is necessary to put this question so clearly that there can be no possibility of a mistake about our answer to it. We can readily understand that if the rise in tension of the globe is due to overdistension of its tunic with fluid, dimpling is impossible, for the fluid is incompressible, and the coats have reached their maximum (or very near it) of distension. But can we say that if the hardness is due to an increase of the intra-ocular blood pressure, the effort to expel the blood from the ocular vessels against an increased blood pressure of 55 mm. of Hg., would call for an exercise of so much force as we know has to be exerted? It seems incredible that this can be so.

(*d*) We return now to consider more at length an important point to which allusion has already been made above. It is practically universally admitted that if a means is provided whereby the contained fluid can effect a free escape from the interior of a glaucomatous eye into the subconjunctival space on the outside of the globe, the tension of the eye is lowered, and that so long as fistulisation is maintained, the tension will not again rise to pathological limits. To put it in other words, if we provide a means whereby the contained fluid can freely escape from the interior of a glaucomatous eye into the subconjunctival space on the outside of the globe, we *ipso facto* reduce the tension to normal or subnormal limits. So long as fistulisation of the eye is maintained, the tension can not and will not rise again to pathologic limits. This is the underlying principle of all the modern operation methods for the relief of glaucoma. De Wecker was one of the first to grasp this idea, and his effort in reply was the operation of sclerotomy, a procedure which is admitted to have been an advance on older methods, but which fell into disrepute, because it was found that as soon as the wound healed soundly, which it generally did sooner or later, the escape of fluid through the scar ceased, and the tension of the eye rose again to pathological limits. The same criticism has been widely offered to Herbert's ingenious operations, subject, however, to the important modification that the *technique* of these methods has proved far superior to that of de Wecker's procedure in establishing, or in endeavouring to establish, a permanent flow through the wound. And so too with Holth's operation, with Lagrange's operation, and with trephining. Be the method what it may, it is a fact established by clinical experience, that the effect of any operative procedure, in maintaining a reduction in ocular tension, can only be counted on so long as the artificial outlet for the escape of the aqueous fluid is kept inviolate. Once let the channel become closed up, by cell proliferation, or by structure prolapse, and a return of the rise in tension may be confidently expected. On the other hand, if too large and too free a channel is cut in the ocular tunic, the escape of fluid is so rapid that a condition of hypotonus is established. Indeed, so real is the latter trouble—it need not be spoken of as a danger, for there is no definite evidence that it is dangerous—that surgeons have been driven to modify their *technique* in such a way as to adapt it to the various conditions of the eyes under treatment. Their endeavour has been to graduate the size of the channel established for the drainage off of the imprisoned fluid, in accordance with the needs of the individual case.

In considering the above facts, it must be borne in mind that the one factor, which the modern operation alters, is the rate of escape of fluid from within the eye to the subconjunctival space. Except indirectly, the pressure of blood within the eye is not interfered with. When the intra-ocular pressure tends to rise, be the cause of that tendency what it may (whether increased secretion, diminished outflow or raised blood pressure), the result must obviously be an increased outflow through the artificial channel in the tunic. If the outflow be sufficiently rapid, then a rise in intra-ocular pressure cannot take place. If this argument be accepted, it becomes clear that the essential factor in the success of all of the modern operations for glaucoma, lies in a control of the volume of the intra-ocular contents.

(*e*) The criticism may be offered that in the preceding paragraphs we have been discussing conditions which are found to exist in eyes, which not only were pathologic to start with, but which have in addition been altered in the mechanism of the circulation of their nutrient fluid, by grossly artificial means. It is therefore of great interest to recall some observations made by Starling before the Royal Society of Medicine on a recent occasion (*Proc. Roy. Soc. of Med.*, Vol. VI, No. 3, January, 1913). He said, "We have studied the conditions which alter the rate at which fluid escapes from the eyeball. Why does one not always find a permanent rise of intra-ocular pressure with a rise of arterial pressure? The association is certainly seen, but it is by no means constant. The explanation is probably found in some experiments by Henderson (Erskine), and myself. If we try the effect of raising the intra-ocular pressure artificially we find that a little time after raising the pressure to 50 or 60 mm. Hg., filtration becomes more easy, as if additional channels had been opened up, or pre-existing channels enlarged. A similar change might occur in the normal eye, and in this way the intra-ocular pressure might be kept at a normal height, although the arterial pressure was permanently raised." If we accept these observations, there is strong reason for thinking that the *modus agendi* of the modern operation is an imitation, a crude one, perhaps, of the age-long and beautifully compensated methods whereby nature has provided against harm being done to the delicate structures of the eye by inevitable fluctuations of intra-ocular blood-pressure. In both cases the underlying principle of the measure is an alteration in the volume of intra-ocular contents. Nature then has shown her agreement with the modern surgeon's estimate that the contents of the eye are neither fixed nor protected against alteration.

(*f*) The subjects discussed in the previous section have led the way to a consideration of the influence of massage on the eye. It has long been known that massage of the eyeball is a very valuable adjunct to the treatment of a case of glaucoma, both before and after operation on the globe. More recently the subject has been systematically studied by various surgeons, amongst others by Carpenter and by Schoenberg. These observers working independently of each other, both lay stress on the fact that the fall in tension observed in different eyes after the use of massage, varies greatly, both in the rate and in the ease of its production; they believe that a delay or a diminution in the reduction of tension may point to a threatening of glaucoma. Carpenter goes so far as to suggest that a normal index of filtration should be worked out by experiments, and thinks that if this is done we shall be in a better position to diagnose doubtful cases. The question naturally arises as to how massage effects a reduction in tension in an unoperated eye. Two explanations occur to one's mind.—(1) That the rate of excretion of the intra-ocular fluid is accelerated by the movements conducted, and (2) That the intra-ocular blood pressure is lowered, and the amount of blood in the eye decreased by the removal of venous blood from the eye. It will be observed that either explanation involves an alteration in the volume of the fluid contents of the eye. It would seem to be practically certain that massage (properly conducted) must lead to an increase in the freedom of escape of venous blood from the eye, as it does from other parts of the body. If so, the actual volume of blood in the organ, and the intra-ocular blood pressure would both be reduced. A consideration of what happens when massage is applied to an eye which has been previously subjected to a successful trephining operation, throws some light on the subject. Some years back the writer called attention to the following experiment which has been often repeated and confirmed by others since then. The tension of a recently trephined eye is taken with a Schiötz tonometer ; then the amount of pitting of the conjunctiva in the neighbourhood of the trephine hole is carefully noted after pressure with a probe. Free massage is employed, and the tension and pitting are again noted. It is now found that the tension has distinctly fallen, and the conjunctival pitting is markedly increased. The obvious explanation of these results is that that the massage has pressed fluid out from the interior of the eye (*i.e.*, from the aqueous chamber) through the trephine hole into the subconjunctival space. The fall in tension has in fact been brought about by a reduction of the fluid contents of the eye. This reduction may be partly due to expression of blood from the veins, but it is certainly also in part due to the escape of the aqueous fluid itself. There would appear to be at least a strong presumption that what happens through the artificial channel of a trephine wound may likewise happen through the normal channels for excretion, since the phenomenon of reduction of ocular tension is observed in both cases.

(*g*) It is the experience of competent pathologists that there is a difference between the feel of an eye excised for glaucoma, and of one removed for conditions in which the tension is not raised. They state that if the globe reaches them quickly and without any delay, they can tell the difference between the two, because the former feels harder than does the latter. It is quite obvious that under such conditions we can eliminate blood-pressure as a factor in producing the feeling of hardness. It is evidently a question of the volumetric contents of the globe, or of the rigidity of its coats. There is a farther observation which sheds light on the problem, *viz.*, that if a glaucomatous eyeball is thrown down on the floor after removal, it "bounces," whilst a normal-tension globe will not do so, or at least that the former will bounce much more markedly than the latter will. The writer cannot claim to have made the experiment, but he has met with those who have either seen it done, or else have actually done it, and the facts are vouched for by observers of absolutely the first rank. That the experiment is unfavourable to the preservation of pathological material is immaterial to our present argument. The obvious inference from it would appear to be that the eye behaves like other elastic globes (*ex. gr.*, a tennis ball or a football), and that its elasticity is increased, within certain limits, by an increase in the distension of its coats ; in other words, by an increase in the volume of its contents. In drawing this inference, sight is not lost of the fact that the contents in the case of the ball are gaseous, whilst those of the eye are liquid.

(*h*) In studying more particularly the question of the *rigidity* of the eye, there are certain observations and experiments which demand our careful attention. It is at the same time of the utmost importance that we should bear in mind the definition* already given of the word "rigid." Adamük, von Hippel, Grünhagen, and other competent observers long ago showed that stimulation of the cervical sympathetic caused a rise in intra-ocular pressure. Parsons demonstrated that the cause of this rise of pressure was the contraction of the unstriped muscle contained in the orbit, and his finding was confirmed by Henderson and Starling, (Parsons, "Pathology of the Eye," Vol. III, p. 1056). More recently Lederer, of Würzberg, has shown by manometric readings that the contractions of the recti and of the obliques raise the intra-ocular pressure. He explains this action by the suggestion that when any muscle and its antagonist act, they draw back the globe against the orbital contents. Again, it is a matter of common and undisputed knowledge that digital pressure temporarily raises the intra-ocular pressure, as can be seen by the behaviour of the retinal vessels. It is equally well-known that prolonged manipulation, or bandage pressure will very appreciably lower the tension of an eye. In the face of such facts, and especially of those which concern the rise in tension, under the influence of extrinsic muscular, or of digital pressure, it does not seem logical to speak of the tunic of the eye as "a rigid case."

(*i*) Closely allied to the above observations, are those in which the intra-ocular pressure is altered, whilst the extra-ocular pressure remains constant, *ex. gr.*, when the operation of paracentesis is performed on an eye the anterior chamber empties, the cornea falls back on the support of the vitreous body, and the change in curvature of the front of the eye is obvious to any observer. After a short delay the chamber reforms, and the curvature of the cornea is evidently restored. Take another instance: Every surgeon is familiar with the cases of "inelastic eye," met with from time to time after extractions. The same phenomenon may sometimes, though rarely, be noticed to occur after any operation (*ex. gr.*, iridectomy), which lets out the aqueous fluid. The sucking of an air-bubble into the eye, or the filling up of the chamber with aqueous fluid from an irrigator, will at once restore to the cornea its normal convexity; let out the fluid once more and the cornea again becomes concave forwards. To use the term "rigid" to the cornea would under such circumstances be clearly incorrect, since it very readily changes its form when acted on by a force acting on it either from its anterior or from its posterior surface. It has been said that "the eye is sufficiently rigid for physiological purposes," and that it "might more or less be regarded as a rigid box." These statements are difficult to answer since it is hard to understand their exact meaning. It is, however, quite possible to push the argument still farther, and to disarm even such vague suggestions as these by a consideration of what we know of the circulation of the fluid within the eye. We shall do so.

(*j*) Koster showed that when the pressure within an eye was raised from 20 to 70 mm. of Hg., the intra-ocular contents increase by 7/1000ths of their normal volume. He also showed that this expansion was a gradual one, corresponding with the gradual rise in the internal pressure. The inference that an increase of 7/1000ths of the volume of an eye would be accompanied by a rise in intra-ocular pressure corresponding to 50 mm. of Hg., seems fairly obvious, *i.e.*, if other conditions remained the same. The actual increase in the volume of the globe in the above experiment is one of 45 c.mm. There has been a tendency to speak of this quantity as if it were negligible. A little consideration will show that this attitude is far from being beyond criticism, as the following facts will show. The cubic contents of the aqueous chambers of the eye have been estimated at from ·23 to ·40 of a cc. The amount of the fluid which leaves the eye per minute has been variously computed at from 5 to 7 c.mm. per minute. It may therefore be calculated that the time which it takes for the whole contents of the anterior chamber to escape, cannot be less than 33 minutes, and may be as much as 80 minutes. In any case the rate of flow is very slow indeed. The knowledge of this fact is obviously of great importance if we would comprehend aright the significance of Koster's figures. Less than half of a c.mm. sounds very little, but it is equal to something between 1/5th and 1/9th of the total contents of the aqueous chamber. Moreover it represents a quantity of fluid which takes 9 minutes to escape from the chambers of the eye. Looked at in this light it can no longer be brushed aside as *une quantité négligeable*. In the same connection must be mentioned Mr. Affleck Greeves' observations on pigs' eyes which were quoted before the Royal Society of Medicine on February 5th, 1913. The principal interest of that communication lies in the fact that the increases in volume observed corresponded closely with the increases in the intra-ocular pressure, thus agreeing with Koster's observations on the human eye.

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*Rigid, such as to resist change of form when acted on by any force.

(*k*) It is of interest to turn from these physiological measurements of very limited stretching of the eyeball to those instances of very extensive stretching of the globe which we meet with constantly in our practice. Many ophthalmologists (including Ischreyt, Levinsohn and Sattler) think that there is in some cases, at least, a connection between high intra-ocular pressure and the stretching met with in myopic globes. In buphthalmos the overstretching of the globe is still more marked, and here the assumption that it is preceded by a pathological change in the tunic of the eye itself, is still more doubtfully accepted. It may be contended that the large globes met with in myopia, megalo-cornea and buphthalmos, are all developed in the young eye. Their very existence, none the less, remains as a protest against the statement that the tunic of the eye is rigid.

Before proceeding any farther, it is convenient to pause here to sum up our conclusions :—

(1). The teachings of physics, physiology, pathology, clinical experience, and surgery seem all to be in agreement on the subjects we have been discussing.

(2). The eye is *not* a closed sphere, since there is a constant flow of fluid through its chambers. This fluid passes into it from without, and again leaves it in due course. Arguments founded on the assumption that the eye is a closed sphere must be received with the gravest doubt ; for, since the premises are incorrect, the deductions therefrom are not likely to be reliable.

(3). The tunic of the eye is *not* rigid. On the contrary, it is very susceptible to the influence of forces acting either from within or from without, and readily changes its form thereunder. Moreover, it is both elastic and distensible. The degree of elasticity and that of distensibility may be small, but these properties are distinctly present, and their existence cannot be disregarded without serious consequences to any argument which neglects to take account of such important factors.

(4). The contents of the eye, so far from being fixed, are continually varying in volume, both in health and disease. These variations determine (*a*) the measure of distension of the ocular tunic, (*b*) the tension of the eyeball (as measured digitally or by means of tonometers), and (*c*) the intra-ocular pressure. The factors which determine the rise and fall in the volume of the intra-ocular contents will be discussed later in this communication. They are somewhat complicated, and include not only those which help to strike the balance between the secretion (the term is used without prejudice) and the excretion of the intra-ocular fluid, but those also which decide the volume of blood present in the different sections (arterial, capillary, and venous) of the intra-ocular vascular system.

[END OF PART I.]

CURRENT LITERATURE.

NOTE.--Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—VISION IN RELATION TO MARKSMANSHIP.

Grow, E. J.—Vision in relation to marksmanship. *Ophthalmology*, October, 1912.

Grow, a surgeon of the United States Navy, presents an interesting paper based on the examination of 270 men of the service, with the object of ascertaining the state of their vision and of their refraction, and whether any relationship could be established between these and their records of marksmanship.

The present standard demanded of gun trainers and pointers in the United States Navy is 20/15 in one eye and 20/20 in the other. The best records he obtained in the men examined were 20/8 with Snellen's types (Gothic style), and 20/10 with Landolt's broken ring. He always finds that the letters can be read two feet further off than the circles subtending the same angle. The great majority of the men had more than 20/20. It was found that reduction of visual acuity was almost invariably accompanied by astigmatism, and that correction of the astigmatism always brought the vision up to standard or better. Astigmatism of less than 0·75 dioptre is of no account in its relation to vision, but when it is of higher amount it causes difficulty with the telescopic sights, and therefore interferes with accurate aiming. The practical bearing of these findings is that a visual standard of 20/15 excludes all cases of astigmatism or myopia which by any chance would interfere with the most accurate aim which is possible to be obtained through telescopic sights, and as plenty of men can be obtained who have this vision, there should be no concession to a lower standard. On the other hand, there is nothing to be gained by demanding a higher standard. The case is different with regard to hypermetropia. One of the men examined had 4·5 dioptres of hypermetropia, and several had almost as much. If from any cause accommodation should fail in any of these men it would render them inefficient in such work as gun training. As it was, several of the men complained of ocular fatigue after prolonged sighting work. On this account he would exclude any man from the rating who has more than three dioptres of hypermetropia, but he does not indicate how these cases are to be discovered before admission, further than to point out that if such a condition is suspected, a special ocular examination should be made.

Coming to the consideration of the records of marksmanship in relation to these results, he finds that exceptional vision is no guarantee of good shooting, and that ordinary or even slightly reduced vision, if associated with less than 0·75 of a dioptre of astigmatism, is no hindrance if United States Navy telescopic sights are used. As a matter of fact, 29 per cent. of the gun pointers and trainers examined failed to meet the visual requirements which have been in force since July, 1908, but many of these men have had several years' experience and have made most excellent scores.

His recommendations are, that all candidates for the ratings referred to should have a minimum V.A. of 20/15 in the sighting eye and 20/20 in the other; that hypermetropes of over three dioptres should be rejected; that all the men should be examined once a year, and any distinct fall of V.A., or asthenopia, or other symptoms should lead to a special examination; and that men who have had the experience of one enlistment should be accepted on the lower standard of 18/20 and 15/20, provided that the reduction is not due to organic disease, myopia, or astigmatism of more than 0·75 of a dioptre.

Several interesting cases are referred to. One of these was a man with a central corneal opacity in one eye with vision of 20/18, that eye being used for sighting because the other had hypermetropia of 4·25 dioptres. This man held the record for gunnery work throughout the entire fleet.

A. J. BALLANTYNE.

II.—PATHOLOGY.

(*Second Notice.*)

(1) **Sattler, Robert.—Short clinical accounts with microscopic demonstrations of two cases of tumour of the optic nerve.** *Archives of Ophthalmology*, January, 1913.

(2) **Bertarelli, Ernesto.—The filterability of the trachoma virus. (Die Filterierbarkeit des trachomatosen Virus.)** *Centralblatt für Bakteriologie, etc.*, Juli 29, 1913.

(3) **McKee, Hanford.—A case of spring catarrh: a pathological report.** *Ophthalmic Record*, July, 1913.

(4) **Fuchs, Ernst.—On opacification of the lens following corneal suppuration. (De l'opacification du cristallin à la suite de suppuration cornéenne.)** *Ann. d'Oculistique*, août, 1913.

(5) **Murakami, S.—The pathological anatomy and pathogenesis o buphthalmos combined with neurofibromatosis. (Zur pathologischen Anatomie and Pathogenese des Buphthalmus bei Neurofibromatosis.)** *Klin. Monatsbl. f. Augenheilkunde*, Oktober-November, 1913.

(6) **Prevedi.—A case of granulomatous tarsitis with diffuse degeneration in a new-born infant. (Osservazione di tarsititie granulomatosa con diffuse degenerazione in un neonato.)** *Arch. di Ottal.*, Marzo, 1914.

(7) **Mawas, J.**—**Researches on the histology and histo-chemistry of xanthelasma (first report). [Recherches sur l'histologie et l'histochimie du xanthélasma. (Premier mémoire.)]** *Ann. d'Oculistique*, juin, 1914.

(8) **Gebb.**—**Experimental researches upon the relationships between inclusion blennorrhœa and trachoma. (Experimentelle Untersuchungen über die Bieziehungen zwischen Einschlussblennorrhoë und Trachom.)** *Zeitschrift für Augenheilkunde*, Juni, 1914.

(9) **Fleischer, Bruno.**—**A case of bilateral kerato-conus, examined anatomically; the hæmosiderin ring of the cornea in keratoconus, and hæmosiderosis of the eye in "diabète bronzé."** *Archives of Ophthalmology*, November, 1914.

(1) In one of the cases by **Sattler**, of Cincinnati, the slow growth of the tumour, with preservation of almost unimpaired vision until five months before the operation was remarkable. Increasing exophthalmus with irritability of the eye from exposure, yet with perfect mobility of the globe, made operation necessary. The tumour was removed by Krönlein's operation, an attempt being made to preserve the globe ; this failed through sphacelation of the cornea, and enucleation became afterwards necessary. Two years later, the patient's health was reported good. The tumour was found to enclose the optic nerve and examination showed it to be a fibro-sarcoma of the dural sheath of the nerve. The other patient was a boy of 4 years, in whom increasing exophthalmus had been noticed for five months. There was optic atrophy. The tumour was removed and afterwards the eye, and fourteen months later, the boy was reported to be in good health. The tumour proved to be a fibro-sarcoma, intra-dural, involving the pia and pial septa of the nerve and also the nerve parenchyma and the central vessels of the nerve. The involvement of the nerve was not concentric, certain areas being quite free from the new-formed tissue. ROSA FORD.

(2) In 1908, **Bertarelli** set up trachoma in the macacus monkey by inoculating with a virus which had been filtered through a small Berkefeld filter. This statement was made by Cecchetto in an article in the *Centralblatt*, but has been latterly forgotten. In 1911, Nicholle, Blaizot, and Cuénod demonstrated that the form of experimental trachoma set up in the macacus is very slight as compared with the form set up in the chimpanzee. This has confirmed the work of those who stated some years ago that they had been able to set up trachoma in the lower monkeys. Bertarelli in the last year has been able to show that the *Inuus ecaudatus* is also susceptible to the trachoma virus.

The point Bertarelli wishes to bring out is that he was the first to show the filterability of the trachoma virus and that practically that is all that is as yet very definitely known about the ætiological factor of trachoma.

HANFORD MCKEE.

(3) The case of spring catarrh by **McKee**, of Montreal, showed no change in the palpebral conjunctiva beyond a slight congestion. In the right eye, on the outer edge of the cornea, the bulbar conjunctiva presented a large, red, uneven, hard nodule extending into the cornea. There was a similar nodule on the inner side of this cornea, and on the outer side of the left cornea. The "milky" appearance of the tumour was pronounced, and the eyes were watery and very irritable. The condition has been recurrent every spring for twelve years. "Bacteriologically, the smear was negative, while the culture showed bacillus xerosis and a few Gram-positive cocci. Histologically, the most noticeable changes were.—(1) The epithelium

was thickened to three or four times its natural depth. (2) It dipped into the tissue beneath giving the well-known epithelioma-like picture. (3) Beneath the epithelium were foci of degeneration. There was also fragmentation of the connective tissue with collections of basic staining *débris*, leucocytes, lymphoid and plasma cells. Ingrowths of new capillaries were also noted. (4) The deeper parts, too, were infiltrated with plasma cells and eosinophiles. There was marked preponderance of the latter, which were often seen between the epithelial cells. (5) Plasma cells were also found in the follicle-like groups, but these were different from the typical lymphoid follicle.

J. JAMESON EVANS.

(4) **Fuchs**, of Vienna, finds that deep suppurations of the cornea may produce anterior polar cataract in adults as well as in children. He thinks that these have not previously been described because they are clinically concealed either by the complete opacification of the lens which usually accompanies them, or by the leucomata resulting from the corneal infection. He considers that the detachment and folding of the anterior lens capsule, with gaping and swelling of the neighbouring lens substance, which are regarded as among the earliest alterations of the lens due to corneal ulceration, are really *post-mortem* changes, because he has found them in lenses which were clear immediately before enucleation, and he has also found similar changes at the posterior pole of the lens. The first change which he has been able to observe is a rarification of the epithelium of the anterior capsule, owing to the destruction of some of its cells. This is followed by (a) stretching, and (b) proliferation of the surviving cells to cover the denuded area. The proliferation may occur in several areas, which may unite later to form one large area, which usually occupies the pupillary region, but may in exceptional cases extend behind the iris. Sometimes these areas remain flat, and are composed of two or three rows of superimposed cells ; but at other times the cells penetrate into the lens as processes which insinuate themselves among the lens fibres, separating and enveloping them, so that masses of more or less altered lens substance may be found in the midst of proliferated epithelium. In fresh cases the epithelium in the neighbourhood of the capsular cataract is almost always defective or rarefied ; but in old cases the regular row of epithelial cells extends right up to the borders of the form of proliferation, and may even be prolonged behind it, as is well known. Fuchs considers that the early defect of the epithelium near the focus of proliferation explains the origin of this proliferation, and sums up his explanation of the phenomenon as follows.—The destruction of a certain number of cells by the toxin present in the aqueous humour in a case of corneal suppuration acts as a stimulant to the neighbouring cells. This sometimes causes the complete repair of the epithelial layer and the restitution of the normal state, but in other cases the epithelial regeneration gives by excess and furnishes so many cells that they are packed against each other in an atypical fashion. He admits that the proliferation of the epithelial cells may be due to irritation from the toxin, but thinks this cause to be exceptional. He rejects Treacher Collins' view that anterior capsular cataract is due to contact of the lens capsule with the cornea after perforation of the latter, because (1) it can occur without perforation, and (2) in cases of luxation of the lens into the anterior chamber cataract occurs only after a very long period of time, while in five of the author's cases of corneal ulcer, it was well marked in less than a fortnight. Fuchs admits that capsular cataract can occur as a result of adhesion of the anterior capsule to a corneal scar, and ascribes its origin in such cases to negative pressure below the capsule. Corneal ulcers can also produce

cataract by causing a lesion of continuity of the lens capsule, and the author considers that membranous cataracts in children following perforation of the cornea are caused by such a lesion. R. J. COULTER.

(5) The number of cases of buphthalmos with neurofibromatosis now reported is sixteen.

The case which forms the subject of this paper by **Murakami**, of Tokio, is one which was described in its clinical aspect by Komoto, in *Klin. Monatsbl. f. Augenheilkunde*, Bd. LXVII, Heft i, S. 635. The microscopic appearances in the eye are now described. The chief noticeable changes were complete obliteration of the angle of the anterior chamber, practically complete disappearance of Schlemm's canal, fibrotic changes in the choroid, and fibromatosis of the nerves, both inside and outside of the eye. The author comes to the conclusion that for this case there was an earlier stage characterised by circulatory stasis, brought about by an overgrowth of connective tissue which interfered with the circulation in the blood- and lymph-vessels, as well as with the nerves. This stasis, in turn, is supposed to have led to hypersecretion, with elevation of intra-ocular pressure; the closure of the filtration angle and obliteration of Schlemm's canal being secondary. A. J. BALLANTYNE.

(6) At the autopsy on a baby, three weeks old, who died from acute enteritis, **Prevedi**, of Parma, found a small tumour in the lower right lid. The mass contained giant cells, and was in parts undergoing softening and caseous degeneration. H. GRIMSDALE.

(7) As a first contribution to a study of xanthelasma palpebrarum, **Mawas**, of Paris, has made a careful investigation of the nature of the xanthelasma cell in a series of specimens obtained from 20 patients at the Fondation Rothschild. With the exception of one girl, aged 18, who had albuminuria, the general condition of the patients was good, and, in particular, there was no evidence of hepatic derangement or diabetes. He finds that the xanthelasma *plaques* are very variable in form and appearance, but most frequently occur as small tumours composed of a series of lobules, separated from each other by more or less thick connective tissue septa, and containing, when suitably treated, typical cellular elements. These contain lipoid elements, which are more or less soluble according to the stage of development which they have reached. These appear first as tiny granules, the number and size of which continually increase until they finally coalesce and fill the cell. The cells also have a tendency to coalesce, giving rise to polynuclear xanthelasmic cells resembling giant cells. The author considers that these cells are of a glandular type, elaborating in their protoplasm a peculiar lipoid product. He rejects the theories that the cells are undergoing fatty degeneration or are phagocytic. As is usual in histological contributions, the details with regard to the methods of examination employed, and the appearances seen, do not lend themselves to abstraction, and should be read in the original, which is illustrated by a series of beautiful coloured plates. R. J. COULTER.

(8) **Gebb**, of Griefswald, by experiments upon human beings (which are quite unjustifiable) has shown that the disease called "inclusion blennorrhœa" can be inoculated from a child's eye to that of an adult, but that trachoma never develops. The child was suffering from ophthalmia neonatorum, and the secretion contained no micro-organisms and certainly no gonococci. The secretion was inoculated into the conjunctiva of the upper lid of two individuals. The lid was previously scarified. A troublesome and chronic conjunctivitis developed, with much thickening of the mucous membrane. No signs of trachoma, such as follicles, pannus, or cicatrization, developed, although the case was watched for two years. During the acute stage cell

inclusions were found in great numbers. The secretion from the child contained cell inclusions in abundance. The baby, 10 days old, was now treated with a "dye mixture" and completely lost all cell inclusions. Two more patients were now inoculated but developed no conjunctivitis. These two patients were now inoculated from cases I and II and at once developed "inclusion blennorrhœa." From them others were inoculated with success. In no case did trachoma appear. Further experiments showed that the virus could pass through a Berkefeld filter, and was not killed by exposure to low temperatures. T. HARRISON BUTLER.

(9) **Fleischer,** of Tübingen, examined both eyes of a man who died at the age of 23. There was bilateral keratoconus, associated with a brown ring of hæmosiderin encircling the centre of each cornea. Anatomical examination showed that this ring had been formed by diffusion of hæmosiderin into the corneal epithelium, and an explanation of the appearance was furnished by the discovery of a small blood-vessel, with a granule of hæmatoidin close by, situated just below a defect in Bowman's membrane. Fleischer thinks that hæmosiderin formed from a small hæmorrhage at this point, diffused through the defect in Bowman's membrane into the corneal epithelium, and that owing to the peculiar conditions of tension existing in the cornea, the pigment spread out in a circular form. The question is discussed at some length. R. H. ELLIOT.

III.—THE LIMITATIONS OF THE TONOMETER.

Smith, Priestley.—On the limitations of the tonometer. *Ophthalmic Review*, March, 1915.

Priestley Smith, of Birmingham, has a lucid article dealing with the limitations of the tonometer.

In the early days of tonometry it was recognised that the instrument measured the impressibility of the eyeball, from which the intra-ocular pressure was inferred. The value of the inference is limited by the circumstance that the impressibility varies not only with the intra-ocular pressure but with several other factors also, such as the size and structure of the eyeball. This important limitation appears to have been somewhat overlooked since we possessed the Schiötz tonometer. We are in the habit of translating the readings of the instrument into so many millimetres of mercury, and of quoting the last-named as if they represented correctly the intra-ocular pressure in this or that eye. The underlying fallacy is at once obvious when it is stated that eyes possessing the same pressure will sometimes give different readings, and eyes having different pressure will sometimes give the same readings.

With a view to determining the error thus introduced, Priestley Smith has conducted a series of experiments, which may be described somewhat as follows:

The experiments have been made chiefly on *post-mortem* material (human eyes *in situ* in the dead subject) and upon the excised eyes of pigs prior to "scalding." A few experiments were conducted upon the excised eyes of sheep and of bullocks.

The appliance employed (*see* Figure 1) consisted of a manometer and an adjustable reservoir, brought into contact with the vitreous chamber of an eye by means of a needle (0·8 mm. internal diameter) and a thick-walled rubber tube, a glass tap being interposed between the eye and the rest of the apparatus. The tap being opened, the eye fills visibly, and the cornea rising a little, takes on a brighter polish. The reservoir is raised to the desired level (24, 34, 44, and 54 cm. successively), and about 30 seconds allowed for expansion of the tunics of the eye. The tap is then closed, and the tonometer applied to the eyeball without delay. The internal pressure, as shown by the manometer, and the reading, as given by the tonometer, are then compared That the pressure of the column of water was fully transmitted to the interior of the eye was shown by a simple observation and comparison. A series of tonometric readings at the different pressures having been taken, the "lens-diaphragm," so to speak, was broken up by means of the injection needle, so as to throw the vitreous and aqueous chambers into one. A fresh series of readings, taken under the same pressures as before, showed no difference. But as Smith points out, the test was not necessary, since it has been proved by Leber that any difference as regards pressure between the two chambers under such circumstances is so small as to be negligible.

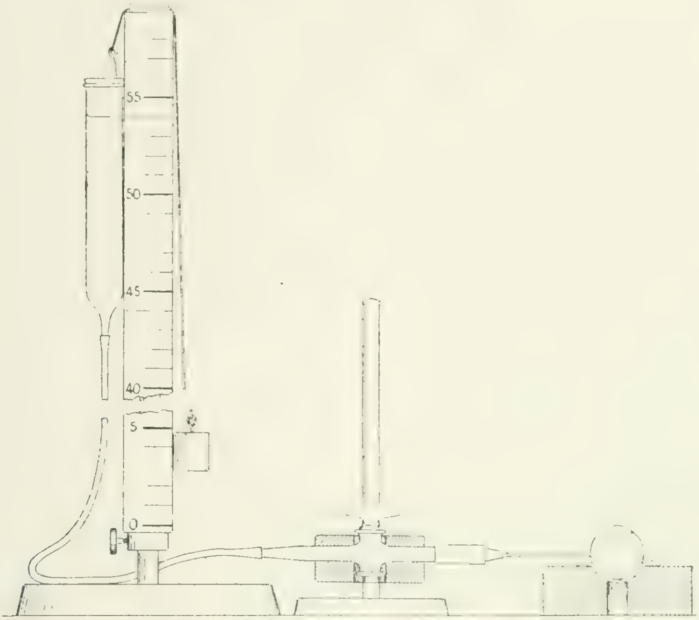

FIG. 1.

With respect to the exactitude of the readings as taken with the Schiötz tonometer, Smith shows how much depends upon the position of the instrument. Its vertical axis should be vertical to, and co-incident with, the vertical axis of the cornea, while the margin of the tonometer and of the cornea should be concentric. He figures five incorrect positions (*see* Fig. 2) all of which are liable to lead to error. The following table gives the errors worked out for all these positions (*b* to *f* inclusive), the manometer pressure standing in all cases at 34 cm. of water. It will be seen that the correct reading was 3·55, while the highest was 6·5 and the lowest 2. Fault *c* gave the largest error in the reading, and appeared to be the one most often made. Faults *b* and *c* gave smaller errors, and they were of opposite kinds. Faults *e* and *f* seemed to involve little error. Priestley Smith surmises that errors of such magnitude as his investigations disclose would not be at all likely to occur in skilful hands through a faulty placing of the tonometer. He found that in his experiments he could usually obtain five successive readings which differed by not more than half a division of the scale.

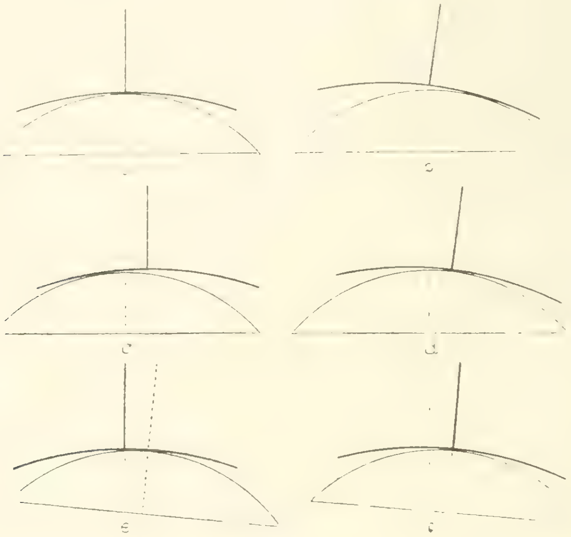

FIG. 2.

Cornea and foot of tonometer—diagrammatic—enlarged three times.
Dimensions: Cornea: radius, 8 mm.; diameter, 12 mm.
Foot: radius, 15 mm.; diameter, 10 mm.
The central rod of the tonometer is not shown, and the foot is shown merely in contact with the cornea, not flattening it by pressure, as it does to some extent in actual use.
(*a*) Eye and tonometer in correct position; their axes vertical and co-incident the margins of cornea and foot concentric.
(*b*) Eye in correct position; tonometer central but not vertical.
(*c*) Eye in correct position; tonometer vertical but not centric.
(*d*) Eye in correct position: tonometer eccentric and inclined.
(*e*) Eye in faulty position—its axis inclined; tonometer vertical and over centre of globe, but eccentric as regards cornea.
(*f*) Eye in faulty position—its axis inclined; tonometer centric in relation to displaced cornea, but not vertical.

TABLE I.—ERRORS DUE TO FAULTY POSITIONS.

	a	b	c	d	e	f
Readings	3·5	2·75	6	2.5	4	3·75
	3·5	2·5	5·5	2.5	3·75	4
	3·5	2	5·5	3	3·75	3·75
	3·5	2·5	6	3.5	3·5	3·75
	3·75	2	6.5	2.5	3·5	3·5
Averages	3·55	2·35	5·9	2.8	3·7	3·75

With what amount of accuracy can the intra-ocular pressure be inferred from the impressibility of the eyeball? The results obtained in pigs' eyes and in human eyes are set forth in a couple of tables. Smith insists that when a tonometric observation is recorded, it is the reading and not the supposed equivalent that should be stated. The former is a fact; the latter a more or less correct inference. In healthy eyes the pressure is stated to vary from 13 mm. to 27 mm. of mercury. This is extremely unlikely, for the statement implies that not only the pressure of the intra-ocular fluid, but also that of the blood in the large veins of the retina and uveal tract is twice as great in some eyes as in others, and all within healthy limits. "Knowing, as we do, that the pressure in different eyes may seem to differ by six or eight or even more mm. Hg., while in reality it differs not at all, we may well doubt the inference in question." The presence of glaucoma, it is stated, should be suspected when the tonometer indicates an intra-ocular pressure of more than 27 mm. of mercury, and also that glaucoma may exist with a pressure of 21 mm. or 22 mm. of mercury. These are inferences and if the facts are required, the figures must be re-converted. Under these circumstances the statements are that a reading less than 2.5 should be regarded as a danger signal, and that glaucoma may be present even with a reading of 4. The extraordinary statements as to the pressure in some conditions of the cornea, as conicity, globularity, and ulceration probably mean that the physical state of the part has greatly altered its impressibility.

Priestley Smith makes it abundantly clear that he regards the Schiötz tonometer as anything but a useless instrument. Although it is not able to measure absolute pressure, yet by its means change of pressure can be indicated with precision. As between the two eyes of one and the same person, it may be relied upon to detect a difference of pressure much smaller than can be elicited by the finger. Allowance must be made for the influence of structural differences between the eyes of one person as compared with the the eyes of others, but "even with that limitation the tonometer is far more trustworthy than the finger as an index to the intra-ocular pressure, for its limitations apply also to the finger test, and *it has no prejudices*" (the italics are ours).

SYDNEY STEPHENSON.

IV.—TRACHOMA.

(1) **Axenfeld, Th.—The Ætiology of Trachoma. (Die Aetiologie des Trachoms.)** *Transactions of the Twelfth International Congress of Ophthalmology*, Petrograd, 1914.

(2) **Meyerhof, M.—The relationships of trachoma to other eye diseases. (Ueber die Beziehungen des Trachoms zu anderen Augenkrankheiten.)** *Actes du XII. Congrès International d'Ophtalmologie*, Petrograd, 1914.

(3) **Mujica, Alejandro.—Trachoma in Chile. (Le trachome au Chili.)** *Actes du XII. Congrès International d'Ophtalmologie*, Petrograd, 1914.

(1) This volume constitutes the official "Report" or introduction to the discussion on the Ætiology of Trachoma which was to have formed part o the programme of the Congress of last August. While it naturally consists for the most part of a survey of the work of others, it is a critical survey in which the writer (**Axenfeld**, of Freiburg i. B.) employs a first-hand knowledge of the matter under discussion. Those who are familiar with the author's contributions to ophthalmic literature will be prepared to find the subject treated in a lucid and attractive fashion, and they will not be disappointed.

Whether the discussion, had it taken place, would have helped to solve any of the problems here suggested one cannot say, but this "Report" remains as a most useful presentment of the present position of the trachoma question, especially with reference to the ætiological significance of the cell inclusions first described by Prowaczek in 1907.

In almost any discussion of trachoma we are met by the difficulty that there is still no fixed clinical criterion of what is trachoma. A striking illustration of this difficulty is afforded by the author's description of a personal experience which is probably new to most of us. In 1896 he successfully infected his own conjunctiva with material from a non-trachomatous follicular conjunctivitis which had occurred among the inmates of an orphanage in Marburg. After an incubation period of ten days, follicles began to form both in the upper and in the lower fornices, and three weeks later, the other eye became affected. No organisms were identified in any of the cases. When the condition was in full bloom, three months after infection, Axenfeld showed himself at the Heidelberg Congress, where Hirschberg, von Hippel, Vossius, and others declared him to be suffering from trachoma, and advised vigorous treatment. He left the condition as much as possible untreated, the symptoms being only trifling, and after eighteen months, it had passed away, leaving the conjunctivæ to all appearances perfectly normal.

The starting point of all the work in trachoma ætiology discussed in this report is the discovery of Prowaczek's bodies in 1907. The fact that these inclusions were present in many cases of trachoma was soon established by a host of observers, and shortly thereafter it was discovered that inoculation of the conjunctiva of some of the higher apes with material from such cases set up an inflammatory condition of the monkey's conjunctiva after a fairly uniform incubation period. The clinical picture was not identical with that of trachoma, as it usually remained free from follicles, and recovered without scar formation, but the incubation period and other features being the same in cases with and cases without follicles, the majority of observers came to the conclusion that this was a true trachoma infection. The subsequent discovery that morphologically identical inclusions were present in cases of ophthalmia neonatorum, more especially in cases free from gonococci, and in the genital discharges from which these cases had received their infection, and that this material could set up a conjunctivitis in the ape identical with that produced by the trachoma material, merely raised fresh problems. For example, are we to conclude that trachoma and the "inclusion" conjunctivitis of the newborn are one and the same disease, in which case we must entirely revise our clinical conception of trachoma, or is the so-called trachoma set up in the ape's conjunctiva a true trachoma at all, and not merely an inclusion conjunctivitis due to an agent which accompanies the trachoma virus in certain cases? Even if the identity of trachoma and inclusion conjunctivitis were established, and it has to be remembered that follicles are the exception in the latter, and that the cell inclusions have never been found in trachoma follicles, there remain unanswered many important questions as to the parasitic or non-parasitic nature of Prowaczek's bodies and the part they play in the conveyance of infection. While the microscopic characters of these bodies, their conveyance from host to host, and their very close association with certain clinical conditions, point to their parasitic nature, it seems very improbable that the Prowaczek bodies, as we know them, are the real infective agents, since the virus of trachoma and of inclusion conjunctivitis has been shown to be filterable, and these bodies are too large to pass the filter. Moreover, infection of the monkey conjunctiva has been produced by material free from cell inclusions.

A considerable portion of Axenfeld's monograph is devoted to a discussion of the different microscopic appearances which have been grouped in the class of "cell inclusions" since Prowaczek's original work appeared. Lindner has pointed out that much less variety of structure is discoverable where the bodies are seen in sections than in smear preparations, and attributes this to the breaking up of the cells, the effects of drying, and the difficulties of fixation in the smear preparations. Space will not permit us to follow the author into his discussion of the significance of the many different appearances alluded to, but he lays special emphasis on the importance of the so-called "initial bodies" of Lindner, small ring-shaped or biscuit-shaped bodies, which he believes to be the earliest visible form of the parasite, although probably not the form in which it first gains access to the cell.

Investigations show that the inclusion conjunctivitis of the newborn is a common and widespread affection. There are serious difficulties in the way of accepting Prowaczek's bodies as the infective agents in trachoma, but the evidence in their favour is much more complete in the case of inclusion conjunctivitis in the newborn. Here it is more easy to detect, occurs in greater numbers, is more constant in its presence, varies more directly with the duration and severity of the disease, is more uniformly transmissable to the ape, and in the ape sets up a condition closely resembling that from which the material was obtained. In the case of trachoma, the evidence brought forward appears on the whole to support the view that when cell inclusions are present, we are dealing with a mixed infection.

A useful section of this volume is that devoted to the technic of the Giemsa and other staining methods employed for the detection of these bodies, and in the six coloured plates the appearances, as seen in sections and in smear preparations under different forms of treatment, are beautifully represented.

A. J. BALLANTYNE.

(2) **Meyerhof**, of Cairo, points out that in Palestine and Egypt trachoma is so common that it complicates almost all eye diseases and injuries. Acute suppurative conjunctivitis is not produced by trachoma itself, but by an infection superposed on a trachomatous conjunctiva. This infection in some countries is due to the Koch-Weeks' bacillus; in Egypt and Palestine to the gonococcus. Angular conjunctivitis is also a frequent complication of trachoma. In children trachoma is often first unveiled by the onset of an acute conjunctivitis due to Weeks' bacillus or the gonococcus, the characteristic signs of trachoma being seen when the acute process has subsided. Gonorrhœal conjunctivitis does not run a milder course in the trachomatous than in the normal conjunctiva. The pannus does not always protect the cornea in these cases, and the pannus itself does not invariably clear up. Trachoma does seem to afford some protection against the pneumococcus, for although suppuration of the lacrymal sac is common in North Africa, ulcus serpens is not often seen.

In all cases of mixed infection it is advisable to treat first the superficial infection and then the trachoma.

Phlyctenular and scrofulous conditions, spring catarrh, and pterygium may be found in association with trachoma, and such conditions as keratomycosis, keratitis ē lagophthalmo, keratitis neuroparalytica, keratitis disciformis, and herpes zoster seem to run the same course when associated with trachoma as they would otherwise pursue. Keratoconus and other forms of corneal ectasia are not uncommon sequelæ of trachoma. Like Osborne, of Alexandria, Meyerhof has been struck with the satisfactory healing of trachomatous eyes after intra-ocular operations. For example, he experienced only three infections in 240 cataract operations, and only one in 900 iridectomies.

A. J. BALLANTYNE.

(3) **Mujica,** of Santiago de Chile, says that trachoma has only existed in Chile since 1881, having been introduced by immigrants. It is found chiefly in persons in poor general health. In his opinion, it ought to be made notifiable, and it should be attacked by all hygienic methods. In the treatment of the condition, attention to the general health of the patient should not be forgotten. A. J. BALLANTYNE.

V.—SHELL SHOCK.

Myers, Charles S.—A contribution to the study of shell shock. *Lancet*, February 13th, 1915.

Charles S. Myers, R.A.M.C., relates at some length the case histories of three soldiers who suffered from shell shock. In all three cases the patients had clearly had narrow escapes from bursting shells. They all, after a period of sleeplessness, suffered from amblyopia with reduced visual fields, from reduced acuity of smell and taste, while one of them also had slightly reduced hearing. In two cases memory was much affected. In his remarks the author says that these cases appear to constitute a definite class among others arising from the effects of shell-shock, and that their close relation to cases of hysteria appears fairly certain. Charts of the fields are given for two of the cases. That it was possible to investigate the cases in this way at the Duchess of Westminster's Hospital at Le Touquet was due to the gift of a perimeter (and test-types) by Colonel Lister, A.M.S.

ERNEST THOMSON.

VI.—THE TELEPHONE ATTACHMENT IN SURGERY.

Davidson, Sir James Mackenzie.—The telephone attachment in surgery. *Lancet*, January 30th, 1915.

In the course of a very interesting address on the use of the telephone in the detection and removal of metallic foreign bodies lodged in the tissues, with special reference to bullets, **Mackenzie Davidson**, of London, makes some special remarks regarding the possible use of the method for the removal of non-magnetisable metallic foreign bodies in the eye.

These remarks are of a tentative nature ; apparently, no actual opportunity has occurred for testing the method on foreign bodies actually within the living eye. A very distinct sound is produced in the telephone on contact with the minutest metal particle ; even an almost invisible particle would give a sound. Davidson's idea is that the particle should first be previously localised by X-rays, and then its removal attempted with the aid of the telephone. He holds out little hope of dealing with a body in the vitreous, since contact would be difficult to secure. The author has proved this on dead animals' eyes.

To any ophthalmic surgeon who wishes to try the method, we would suggest a study of Mackenzie Davidson's article. He will there obtain the details necessary for the working out of a *technique* for himself. Such *technique* would have to be thought out and devised, and the instruments designed (so far as we can gather, no special instruments for the eye have yet been made) by the ophthalmic surgeon himself.

The proposed method seems to open out interesting possibilities in those very hopeless cases where a non-magnetisable metallic body penetrates the eye and cannot actually be seen. ERNEST THOMSON.

VII.—EYE-STRAIN.

(1) **Greenwood, Allen.—Ocular vertigo.** *Journal American Medical Association*, September 27th, 1913.

(2) **Harcourt, R. E.—Fits due to uncorrected errors of refraction.** *Liverpool Medico-Chirurgical Journal*, January, 1914.

(3) **Pronger, C. Ernest.—Insomnia and suicide.** *American Medicine*, October, 1914, and *Lancet*, December 12th, 1914.

(4) **Taylor, Johnson.—Faith and astigmatism.** *Lancet*, January 30th, 1915, and February 6th, 1915.

(5) **Evershed, Reginald.** *Ibid*, February 6th, 1915.

(1) **Greenwood,** of Boston, U.S.A., reports in detail nineteen cases of vertigo, without aural, digestive, or other disturbance, where the symptom was got rid of by wearing correcting glasses. The ages of the patients ranged from 11 to 54 years. Of the nineteen patients, there were seventeen having astigmatic eyes, with one or both axes oblique, fifteen showing asymmetric axes, and seventeen slight anisometropia. The author states that "in all probability, the majority of the cases of ocular vertigo result from moderate errors of refraction, and usually occur in patients whose eyes show astigmatism with asymmetric oblique axes." Muscular errors come scarcely into the count at all. SYDNEY STEPHENSON.

(2) **Harcourt,** of Liverpool, reports the case of a man, 19 years of age, who after close study, developed intense headache and hystero-epileptic fits. The last-named were of recent onset, and almost daily occurrence. During a period of observation extending over twenty-four days, the patient had twenty-two of these convulsive attacks, eight of which were severe and the others slight. The patient was wearing *plus* 3·0 D. sph., with which he read: R. E. 6/60 and L. E. 6/36. Harcourt prescribed *minus* cylinders, with the addition of a weak *plus* sphere in the left eye. Two years have now elapsed since the patient, who has meanwhile passed into the Ministry, has had a fit. SYDNEY STEPHENSON.

(3) After some more or less general remarks upon the connection between insomnia and suicide, **Pronger,** of Harrogate, sets himself to enquire what is being done by the medical profession in the way of prevention. In a recent discussion on "Insomnia" held at Brighton in July, 1914, under the auspices of the British Medical Association, Pronger fails to find a word about eye strain, which he believes to be the most constant and most potent predisposing cause of sleeplessness. Among the difficulties that have to be surmounted in the treatment of insomnia by glasses is the scepticism of the patient as to spectacles being of use for such a purpose, especially if the sight be good, or an ophthalmic surgeon has already been consulted. The author relates in a graphic manner several very striking cases where relief followed the wearing of proper glasses. SYDNEY STEPHENSON.

(4) In a very readable letter to the Editor of the *Lancet*, **Taylor,** of Norwich, pours a considerable amount of cold criticism on the views of C. E. Pronger and Ernest Clarke, regarding the power of weak cylinders to cure various diseases.

(5) **Evershed,** of London, in the *Lancet* of the following week, takes up the cudgels on the other side, and details the minute subjective examination to which he puts his patients in order to correct what we may perhaps be allowed to call the "mighty atom" of astigmatism. But we all have "views" on this subject. S. E.

VIII.—PRE-RETINAL HÆMORRHAGE.

(1) **Guzmann, Ernst.—Hæmorrhage between the retina and the vitreous. (Ueber die Blutung zwischen Netzhaut und Glaskörper.)** *Klin. Monatsbl. f. Augenheilkunde*, November, 1912.

(2) **Fisher, J. Herbert.—Drawing of semilunar retinal hæmorrhages (so-called sub-hyaloid hæmorrhages).** *Proceedings of the Royal Society of Medicine*, December, 1912.

(1) **Guzmann**, of Vienna, discusses two cases:

The first was one of iridocyclitis, optic neuritis, and choroiditis, with some retinal hæmorrhages. Six P. D.'s. below the disc there was a horizontally placed hæmorrhage 2½ P. D.'s. in length and twice as wide as the central retinal vein. It lay in front of a retinal artery. The author thinks that the form and position of the hæmorrhage make it certain that it was in front of the membrana limitans interna, and was therefore a true pre-retinal hæmorrhage.

In the second case there was no clinical observation of the condition, but histologically there was a hæmorrhage in front of the macula. It lay behind the limitans interna.

After discussing the attitude of different authors to the question of the situation of the so-called "pre-retinal" hæmorrhages, Guzmann comes to the conclusion that there is only one membrane between the retina and the vitreous, namely, the membrana limitans interna, that this lies in front of most "pre-retinal" hæmorrhages, but that sometimes the blood passes through it. When it does so, it is prevented from penetrating into the vitreous by the firmer consistency of the peripheral layers of the vitreous.

A. J. BALLANTYNE.

(2) In the case reported and figured by **Fisher**, of London, the patient was aged only 45 years. It is stated that his vessels were healthy, and that there was no obvious increase of arterial tension. The author considers that the hæmorrhages were due to venous obstruction in the central vein. The ophthalmoscopic appearances in this case conclusively prove to the author the venous origin of these peculiar hæmorrhages, and the case shows that blood extravasated may find its way with great rapidity into the vitreous humour. Fisher considers that since there is difference of opinion as to the exact situation of the blood in these cases, it would be better to discard the term "sub-hyaloid" and call the hæmorrhages "semilunar."

ERNEST THOMSON.

IX.—THROMBOSIS OF THE CENTRAL RETINAL VEIN.

(1) **Purtscher, Adolf.—Thrombosis of the central vein and metastatic ophthalmia. (Thrombose der Zentralvene und metastatische Ophthalmie.)** *Klin. Monatsbl. f. Augenheilkunde*, Januar, 1913.

(2) **Ormond, A. W.—Thrombosis of the retinal veins.** *Trans. Oph. Soc. U. K.*, Vol. XXXIII, 1913, p. 90.

(3) **Deutschmann, R.—Complete restoration of function after apoplexia sanguinea retinæ. (Thrombosis of the central vein.) [Völlige Wiederherstellung der Funktion nach Apoplexia sanguinea retinæ (Thrombosis venæ centralis).]** Deutschmann's *Beiträge zur Augenheilkunde*, Heft. XXXVII, April, 1914.

(1) **Purtscher's** patient, a woman, 70 years of age, presented herself with thrombosis of the lower branch of the central vein in the left eye. Sixteen days after the onset, she developed pneumonia in the left lung, in the course of which the left eye showed signs of severe iridocyclitis, which developed into panophthalmitis with ring abscess of the cornea. Pneumococci were grown from the vitreous. Purtscher discusses the possible relationships between the thrombosis, the lung affection, and the panophthalmitis. He is of the opinion that the existence of the thrombosis, with the consequent stagnation of the circulation, caused a lowering of the resistance of the tissues, and provided suitable conditions for the development of a metastatic intra-ocular infection. A. J. BALLANTYNE.

(2) A lad of twelve years was shown by **Ormond**, of London, in October, 1906, as an instance of ? thrombosis of the retinal veins in both eyes. Seen again in 1913, R.V.=6/5, and L.V.=6/60. Hæmorrhage into vitreous chamber of the left eye. Family history of tubercle. Positive tuberculin reaction (Koch). Ormond surmises that the case is one of retina hæmorrhage due to thrombosis of the retinal veins, associated with tubercle
SYDNEY STEPHENSON.

(3) **R. Deutschmann**, of Hamburg, quotes two cases, the first published by Pinkus, and the other by Hillemann and Pflalz, in which restoration of function occurred after thrombosis of the central vein of the retina. In the second of these cases the authors came to the conclusion that an injury which had been received by the eye from a flying piece of wood was the cause of the fundus condition, basing this opinion largely on the supposition that if the thrombosis had been due to retinal vascular disease, such a favourable outcome would not have occurred.

In the case here recorded by Deutschmann there was also a history of injury, a blow from a springing twig, three weeks before the first observation. Vision was 17/200 and No. 15 Jaeger. The fundus presented the typical picture of thrombosis of the central vein. No evidence of heart or kidney disease or of syphilis was found. Under general treatment, the fundus gradually cleared up and vision steadily improved. After seven months, vision was practically the same as in the unaffected eye, *viz*, 17/20, and the fundus was normal but for the presence of coils of dilated vessels on the disc.

Deutschmann does not think that the trauma can be accepted as the cause of the retinal thrombosis. An important feature both in this case and in that of Pinkus was the presence on the disc of a venous coil which apparently represented a collateral channel for the blood stream. A. J. BALLANTYNE.

X. VISUAL PROGNOSIS IN INTERSTITIAL KERATITIS.

Golesceano, C.—The prognosis of vision after attacks of interstitial keratitis. (Le pronostic de la vision après les atteintes de kératitis interstitielles.) *L'Ophtalmologie Provinciale*, juin, 1914.

Golesceano, of Paris, in the course of his article mentions several important matters in connection with interstitial keratitis. From the point of view of ætiology and pathology, he considers the disease a complex one, and he believes that the diagnosis is not easy in the prodromal stages. Among other facts, he states that exacerbations in the course of an attack of interstitial keratitis should not be counted as fresh attacks, the percentage of which is 35 per cent. The type of central infiltration is the commonest. In hereditary syphilis the frequency is greatest up to the twentieth year; there is no sex predisposition. In four cases the onset was bilateral. The author draws attention to the teeth, facies, atrophic rhinitis with or without ozœna, and occasionally deafness, in young children; in adults with acquired syphilis, a history of traumatism and trophic changes is important. Prodromal manifestations include kerato-conjunctivitis and peri-corneal phlyctenules; there may be little or no irritation, the infiltration may be peripheral first, and become central later; in each position it may remain for some months. Recurrences are not uncommon, but do not last as long as the previous attack.

Golesceano draws attention to the intolerance towards atropine, noticed in some cases. Mercury and arsenic give the best results. PHILIP A. HARRY.

XI.—PNEUMOCOCCAL PANOPHTHALMITIS.

(1) Fava, Attilio.—Experimental metastatic pneumococcal panophthalmitis. (Panophtalmie métastatique expérimentale pneumocoque.) *Ann. d'Oculistique*, mars, 1913.

(2) Dalmer, Max. Metastatic panophthalmitis resulting from pneumococcal infection. (Ueber metastatische Panophthalmie infolge Pneumokokkeninfektion.) Deutschmann's *Beiträge zur Augenheilkunde*, Bd. LXXXVII, April 1914.

(1) **Attilio Fava**, working in the Institut Pasteur, at Paris, has endeavoured, on the advice of Morax, to produce metastatic lesions in the eyes of rabbits by injecting into their veins pneumococci of attenuated virulence. For this purpose he employed a strain which had been tested by injecting it into the veins of a rabbit without killing it, and subsequently passed through the eyes of three rabbits. Injections were made into the marginal veins of the ears of five rabbits. In two cases panophthalmitis was produced, in one case an abscess formed in the upper lid, and in the remaining two cases no lesions resulted. All these lesions were produced without any traumatism of either of the eyes of the animal to favour localisation of the microbe.

Fava concludes that pneumococcus which has passed through the vitreous of animals acquires a selective action on the eyes when injected into the veins of a rabbit. R. J. COULTER.

(2) After referring to the literature of the subject, **Dalmer**, of Giessen, gives details of a case which has come under his own observation.—The patient, who gave a history of several attacks of jaundice, was admitted to hospital for cataract extraction. This was performed on the left eye, and healing ran a normal course. A fortnight later, the patient suddenly developed a febrile condition, with jaundice, and in the course of another week, pain set in in the right eye, followed by signs of panophthalmitis. The operated eye remained unaffected. Pneumococci were recovered from the anterior chamber of the right eye. Death supervened, and *post-mortem* examination established the diagnosis of multiple abscesses in the liver due to cholecystitis. Pneumococci were found in the abscesses. Examination of the affected eyeball showed panophthalmitis, suppurative inflammation of the cornea and iris with partial necrosis, almost complete necrosis of the retina, and intense cellular infiltration of the choroid and vitreous. Some of

the retinal vessels were blocked with zooglea masses composed of pneumococci, suggesting that the ocular infection occurred by embolism in the retina. Points of interest in the case were the immunity of the operated eye, the formation of zooglea masses blocking the vessels, the presence of corneal and iridic infection which had apparently occurred through embolism of ciliary vessels, and the somewhat unusual source of the ocular infection, namely, from the biliary channels. A. J. BALLANTYNE.

XII.—PARALYSIS OF OCULAR MUSCLES.

(1) **Inouye, Nobuo.—A remarkable case of paralysis of the inferior oblique muscle. (Ueber einen bemerkenswerten Fall von Lähmung des Musculus obliquus inferior.)** *Klin. Monatsbl. f. Augenheilkunde*, Februar, 1912.

(2) **Steindorff, Kurt.—A case of isolated paralysis of the inferior oblique muscle. (Ueber einen Fall von isolierter Lähmung des M. obliquus inf.)** *Klin. Monatsbl. f. Augenheilkunde*, Oktober-November, 1913.

(3) **Woodruff, Frederick E.—Report of a traumatic paralysis of both external recti.** *American Journal of Ophthalmology*, September, 1914.

(1) Isolated paralysis of an inferior oblique muscle is very rare (from 1 in 2,000 to 1 in 7,000 cases, according to different authors). **Inouye's** case therefore forms an interesting contribution to the literature of the subject.

The patient, a woman, 27 years of age, suffered from empyema of the left antrum of Highmore, in the course of which acute articular rheumatism supervened. The operative treatment of the empyema, and subsequent syringing, led to closure of the left eye by swelling of the lids. When this swelling subsided, after a week or two, the patient complained of diplopia. Under the circumstances, it was impossible to ascertain at what date the deviation of the eye occurred. Recovery was complete three months later.

Diplopia was vertical, the image of the left eye being the lower, and the upper end of the right image being rotated outwards. The vertical displacement diminished slightly both in upward and in downward movement of the eyes. When the eyes were turned to the left, the vertical displacement increased, while the obliquity of the right image diminished, the opposite effects occurring with rotation of the eyes to the right. This behaviour of the images in lateral rotation of the eyes suggests paralysis of the left inferior rectus, but there was no increase of the vertical deviation on lowering the gaze, and no difference between primary and secondary deviation. Inouye points out that, if we assume that the paralysis had been in existence for several weeks, this would be explained by the tendency which paralytic squints show to assume the characters of the concomitant type. In such atypical cases, however, valuable information may be obtained by studying, as Bielschowsky recommends, the effect on the double images of lateral inclinations of the head. The phenomena as described above might be due to paralysis, either of the left inferior rectus or of the right inferior oblique. The former rolls the left eye outwards, and the latter rolls the right eye outwards. Under normal conditions, when the head is inclined to one side there is produced reflexly a torsion of both eyes in the opposite direction. When the head is inclined to the left, the muscles which produce the necessary torsion of the eyes to the right are the right inferior oblique and inferior rectus, and the left superior oblique and superior rectus. Thus in each eye the muscles act together in their torsional effect, but are antagonists as regards vertical movement. If, now, the right inferior oblique is paralysed, and the head is inclined to the left, the right inferior rectus acting without its oblique antagonist draws the right eye downwards. This is actually what occurred in Inouye's case, and he concludes that the affected muscle was the right inferior oblique. As regards the connection between this and the affection of the left maxillary antrum, he assumes a nuclear lesion caused by metastasis.

A. J. BALLANTYNE.

(2) **Steindorff**, of Berlin, has found records of thirteen cases of isolated paralysis of the inferior oblique muscle. It is apparently a rare occurrence, being seen by different observers in only one case out of from two to seven thousand. It is usually due to trauma of the inferior orbital region or to operation in the neighbourhood of the muscle. Other cases have been attributed to syphilis and rheumatism. The prognosis is uncertain, but is not always unfavourable. Recovery may occur in cases where the nerve has been injured by blood effusion or by some removable cause.

Steindorff's case developed diplopia and limitation of ocular movement shortly after evacuation and scraping of frontal, ethmoid, and sphenoid sinuses. The eyes were in other respects normal, and Wassermann's reaction was negative. Operation, in the form of tenotomy of the opposite rectus superior, followed by advancement of the opposite inferior rectus, was ineffectual.

A. J. BALLANTYNE.

(3) A boy, aged 4½ years, fell a distance of eight feet. The only marks of injury were on the shoulder and side of the nose. Ten days later, **Woodruff**, of St. Louis, was called to see the patient. He could find no evidence of eye disturbance except double convergent squint, with a paralysis of both external recti. There had been no symptoms pointing to fracture of the base of the skull.

The author then summarises the causes of double sixth nerve paralysis, but does not speculate as to the exact ætiology in his own case.

S. E.

XIII.—MYOPIA.

(1) **Parisotti.—Myopia. (La myopia.)** *Rivista Ital. di Ottal.*, 1912, 1913, and 1914.

(2) **Perrod, J.—Clinical observations upon hereditary myopia. (Osservazioni cliniche sulla miopia ereditania.)** *Annali di Ottalmologia*, Vol. XLI, fasc. 1-2, p. 34 to 48.

(3) **Le Fever, C. W.—Myopia etiology and the optical management.** *Ophthalmology*, October, 1913.

(4) **Harman, N. B.—An analysis of three hundred cases of high myopia in children, with a scheme for the grading of fundus changes in myopia.** *Transactions Ophthalmological Society U.K.*, Vol. XXXIII 1913.

(5) **Levinsohn, G.**—**Die Enstehung der Kurzichtigkeit mit Demonstration kurzsichtig gemachter Affen.** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1913, page 217.

(6) **Meyerhof, M.**—**A study of myopia as a racial and hereditary disease among the Egyptians. (Etude sur la myopie comme maladie de race et maladie héréditaire chez les Egyptiens.)** *Ann. d'Oculistique*, avril, 1914.

(7) **Pollock, W. B. Inglis.**—**The education of the semi-blind.** *Glasgow Medical Journal*, December, 1914.

(1) This long paper, by **Parisotti**, of Rome, spreads over twenty numbers of the *Rivista*, and contains a mass of interesting statistics which are very hard to condense. The author has investigated the relative frequency with which hereditary influence, derived from the father or the mother, or both, affects the two sexes. The question has been examined in a large number of patients, and the conclusions to which Parisotti comes are, that there is some evidence that the father tends to transmit myopia to the female children, and the mother specially to the sons, but that the tendency may be latent only, and that therefore the other causes, of such great importance in the production of myopia, may entirely overshadow the hereditary influence. All statistics, then, can have but little value.

"We may, however, perhaps feel satisfied of the fact that very many myopes who are not generally recognised to inherit the tendency may really do so, in the sense that without heredity the other causes would not have sufficed to occasion the development of myopia." HAROLD GRIMSDALE.

(2) **Perrod**, of Turin, insists upon the hereditary character of myopia: or rather upon the tendency to become myopic. With respect to monocular myopia, more or less marked, and accompanied with ophthalmoscopic lesions, Perrod omits to state that the fact was mentioned for the first time in the reviewer's thesis of 1897, and still further developed in the communication he made in 1908 to the French Society of Ophthalmology, where he attributed it to congenital syphilis, as in a case which he resumes and which is assuredly typical. Anisometropia, as the reviewer has often affirmed, is almost always connected with monocular myopia or a myopia of much higher degree in one eye than the other: the eye which is alone myopic or is the more myopic presents ophthalmoscopic lesions characteristic of pathological myopia—that is to say, a myopia not purely axial, but one symptomatic of dystrophies, malformations, or pathologic processes, which are the cause, and not the consequence, of the thinning and lengthening of the eyeball. A. ANTONELLI.

(3) **Le Fever**, of Philadelphia, distinguishes two types of myopia: a stationary form, usually due to the curvature of the cornea, and not associated with destructive changes; and a progressive form, axial in character and generally attended by destructive changes in the choroid and other parts. He does not accept the muscle pressure theory of the causation of myopia; and, as regards occupation, he thinks that the pursuit of certain occupations is rather the result than the cause of the myopia. Near work, in so far as it involves the use of the accommodation, does not promote increase of the myopia. On the contrary, wearing the full correction brings in the necessity for exercise of the accommodation, and guards against increase of the optical error. The author believes that the sclera is more easily stretched in the young, but that it becomes more "mineralised" as time goes on, and more

resistant. He therefore attributes the passage of the young eye from hypermetropia to myopia to the imperfect rigidity of the sclera, combined with the fact that the sclera receives less support from the choroid in the young eye.

The best management of myopia is believed to be that which early encourages the exercise of the ciliary muscle. He therefore recommends the prescription of the full correction, and the encouragement of the use of the eyes in near work. Attention to diet, exercise, and hygiene in general should be kept in view. If the first correction is made in later life, it will be necessary to order less than the full correction, owing to the smallness of the available accommodation. A. J. BALLANTYNE.

(4) This article, by **Harman**, of London, on high myopia in school children, should be read by all in the original. The scheme outlined for the grading of fundus changes is based on an estimation of the size of the patch of circumpapillary atrophy as an indicator of the gravity of the myopia. It was fully described by the author in THE OPHTHALMOSCOPE of June, 1913. Regarding the educational treatment of myopes, the author says that extreme cases with bad vision will need admission to schools for the blind as heretofore. The greater number of myopes are not blind, nor are they likely to become so with ordinary and reasonable precautions, and are not fit subjects for admission to blind schools. For them a form of education specially adapted to their circumstances is necessary; and they are sufficiently numerous and intelligent to demand this attention and provision. Harman refers to the beginning which has been made in London in dealing with these children, and to his own articles on the subject in the *British Medical Journal* (October 29th, 1910) and *Proceedings Royal Society of Medicine* (Vol. VI, No. 8, Ophthalmological Section, July, 1913).

ERNEST THOMSON.

(5) **Levinsohn**, of Berlin, has, as is well known, written a monograph in which, after a critical review of all the theories regarding the development of myopia, he advances the theory that short-sight is due to the weight of the eyes pulling upon the optic nerves and so lengthening the globe. He then described the effect of hanging kittens up head downwards. Some of those which survived were, he stated, myopic.

He has now repeated his experiments with young monkeys, confining them in small boxes in such a manner that they were obliged to remain in a position in which the eyes were directed downwards. Most of these monkeys died, but the survivors were myopic.

Levinsohn's results were criticised by the Congress. **v. Hippel** said that although he held no brief for the anti-vivisectionists, he regarded Levinsohn's experiments as cruel and quite unjustifiable. T. HARRISON BUTLER.

(6) **Meyerhof**, of Cairo, has drawn the following conclusion from an investigation of the cases of myopia occurring among 7,617 private patients. The Egyptian race is particularly subject to hereditary weakness of the posterior sclerotic, which by yielding gives rise to myopia. The percentage of myopes in Egypt, in spite of the want of education in the lower classes, is almost as large as in the European countries where myopia is commonest. This fact is the more remarkable because the southern neighbours of Egypt (the Nubians and Soudanese) are almost exempt from it. It does not depend on the curvature of the cornea, but perhaps, as suggested by Stilling, it may be due to lowness of the orbit. It is possible that the frequency of corneal opacities and astigmatism, as well as of consanguineous marriages and anæmia, contribute to produce myopia in a people already predisposed to it.

R. J. COULTER.

(7) The interesting, albeit brief, article by **Pollock**, of Glasgow, should be

read by all those who are interested in the education of young myopes, for, indeed, the article really deals mainly with school myopia. After pointing out the various eye diseases which give rise to the condition of semi-blindness; on the one hand, myopia, and on the other hand, such defects as congenital cataract, leucomata, and nystagmus, Pollock synopsises present educational methods for such cases, paying particular attention to Bishop Harman's work. The author does not believe in teaching these children, as if they were blind children, by means of Braille. They will learn Braille more or less at school, using their eyes to the type when the teacher's back is turned, and will read ordinary type at home. The preferable method is that by which they attend school, and are taught by hearing and the use of the blackboard. ERNEST THOMSON.

XIV.—OPERATIONS.

7.—Detached Retina.

(1) **Bettremieux.—Two cases of myopic detachment of the retina cured by total sclerectomy. Technique of the operation. (Deux cas de décollement rétinien myopiques guéris par la sclérectomie totale. Technique de l'Opération.)** *Société Belge d'Ophtalmologie*, 28 avril, 1912.

(2) **Tiffany, F. B.—A new operation for detached retina.** *Ophthalmic Record*, March, 1914.

(1) **Bettremieux**, of Roubaix, presented two myopic patients, affected with detachment of the retina, in whom he had performed simple sclerectomy. In the first patient, in whom the detachment had provoked the phenomena of metamorphopsia and invaded the lower half of the ophthalmoscopic field, all that could now be seen was a greyish aspect of the retina extending to the limit of the field accessible to the ophthalmoscope. Cure had been maintained for two years. In the second case there had been a detachment of the outer ophthalmoscopic field; the sight had now returned to normal.

In order to make the sclerectomy, local anæsthesia by coca-adrenalin sufficed. The operation was undertaken as a rule at that part of the sclera tangential to the lower border of the cornea. The conjunctiva and the subconjunctival tissue were dissected up with care for a distance of 12 mm.; the sclera was seized by special forceps, each blade of which terminated in a perpendicular point; the excision was made with Graefe's knife; the breach had a length of 10 mm. and a width of 2 mm. Finally, the conjunctiva was sutured.
MARCEL DANIS.

(2) **Tiffany**, of Kansas, Mo., endeavours to establish permanent drainage of the subretinal space, so that sufficient time is allowed to enable the retina to become permanently re-attached. To this end he trephines the sclera opposite the central portion of the detachment with an Elliot's trephine, and as the choroid presents itself through the opening, he grasps the protruding knuckle and cuts it away with flat curved scissors, thus allowing the retina, which then gets forced into the opening, to come into contact with both

choroid and sclera, and to form a firm permanent adhesion. If it should fail to adhere firmly at this point, he would not hesitate to trephine at another point, or even to apply an electric cautery.

He reports a case in which detachment of the retina in the superior and external quadrant had resulted from an injury, vision being less than counting fingers. A week after the operation his vision was 6/20, and he could see both to right and left, or "had the normal field of vision." The case does not seem to have been observed for any longer period.

J. JAMESON EVANS.

8.—The Surgical Treatment of Glaucoma.

(1) Cusner.—Linear sclerectomy for chronic glaucoma. (Sclérectomie linéaire pour glaucome chronique.) *Société Belge d'Ophtalmologie*, 28 avril, 1912.

(2) Gauthier.—Acute glaucoma of both eyes; iridectomy of one eye and sclerotomy of the other. (Glaucome aigu aux deux yeux; iridectomie à un œil, sclérotomie à l'autre.) *Société Belge d'Ophtalmologie*, 28 avril, 1912.

(3) Henderson, E. Erskine.—A case of glaucoma. *Ophthalmic Review* January, 1913.

(4) Bettremieux.—On simple sclerectomy in acute glaucoma. (La sclérectomie simple dans le glaucome aigu.) *Ann. d'Oculistique*, août, 1913.

(5) Wyler, Jesse S.—The trephining operation in glaucoma. *Annals of Ophthalmology*, October, 1913.

(6) Peter, Luther C.—Sclero-corneal trephining in glaucoma. *Ophthalmic Record*, January, 1914.

(7) Denig, R.—A few remarks on trephining. *Ophthalmic Record*, January, 1914.

(8) Butler, T. H.—Upon the punch operation for the relief of glaucoma (Ueber die Locheisen-Operation zur Beseitigung des Glaukoms.) *Zeitschrift für Augenheilkunde*, April and May, 1914.

(9) Sym, W. J.—Recent advances in medical science—ophthalmology. *Edinburgh Medical Journal*, June, 1914.

(10) Bourgeois, A.—Iridectomy in glaucoma, and cystoid cicatrix. (Iridectomie dans le glaucome, et cicatrice cystoide.) *L'Ophtalmologie Provinciale*, juin, 1914.

(11) Alexander, G. F.—A case of malignant glaucoma successfully treated by repression of the lens. *Ophthalmic Review*, July, 1914.

(12) **Green, John, Jr., and Hardy, William F.—Removal of globe after sclero-corneal trephining.** *American Journal of Ophthalmology*, August, 1914.

(13) **Abadie, Charles.—A propos the new methods of treating glaucoma. (A propos des nouveaux traitements du glaucome.)** *La Clinique Ophtalmologique*, 10 août, 1914.

(14) **Gradle, Harry, S.—The treatment and indications for operation in glaucoma simplex.** *Annals of Ophthalmology*, October, 1914.

(15) **Guglianetti, L.—Sclero-corneal trephining (Elliot's procedure) in the treatment of glaucoma.** *Archivio di Ottalmologia*, 21st year, p. 393.

(16) **Callan, P. A.—Glaucoma from the operative standpoint.** *New York State Journal of Medicine*, Vol. 14, p. 577.

(1) **Cusner**, of Brussels, presented three patients who had been treated by simple linear sclerectomy for chronic glaucoma. The conjunctiva had been incised at a distance of 1.5 mm. from the limbus, and a piece of sclerotic excised of 1, 2, or 3 cm. in length, leaving a layer of such transparency that the uvea was visible. MARCEL DANIS.

(2) In a patient affected with acute glaucoma of the left eye **Gauthier**, of Brussels, made an iridectomy at once. The day after the operation the other eye was attacked with acute glaucoma. After pilocarpine had been instilled for four days, Bettremieux's sclerectomy was performed. Result: R.V. 2/3; L.V. 1/3; field of vision normal. The tension was slightly higher in the right than in the left eye. MARCEL DANIS.

(3) An iridectomy on the left eye was performed by **Henderson**, of London, for an attack of acute glaucoma, but the final result was loss of perception of light.

Five months later, the other eye was found to be affected with some contraction of field, the tension being full normal; there seemed to be an increase of the physiological cup. The eye was trephined, and owing to a slight prolapse of the iris, a small iridectomy was done not quite reaching to the sphincter. Three months after, all lost field had been recovered, and the vision was full. Possibly, the failure to relieve by the iridectomy in the first eye was due to the acute attack being the termination of a chronic condition.

A. H. PAYAN DAWNAY.

(4) **Bettremieux**, of Roubaix, urges the value of non-perforating sclerectomy in the treatment of all forms of glaucoma. He records a case of acute glaucoma in which it gave a most satisfactory result, and also refers to a subacute case in which it was followed by an aggravation of the symptoms, but states that the latter is the only instance of which he knows in which the procedure has been followed by any untoward result. R. J. COULTER.

(5) **Wyler**, of Cincinnati, expands in this communication the paper he published in 1912 on the subject of trephining for glaucoma, and adds "my present experience exactly doubles the number of cases reported, and with a longer interval in which to judge results, my high opinion of this operation has not varied." He employs "a slightly modified Elliot trephining." He prefers a von Hippel trephine to a hand-driven instrument; he trephines exactly at the limbus, and if the iris prolapses, he cuts it radially. He finds that complications are relatively few in number, and that the advantages of the

operation are many. He sums up the latter as follows: (1) it is easy to perform, and complications are rare, (2) the danger of infection is slight, (3) a round complete pupil remains, (4) the depth of the chamber has no influence, and post-operative hæmorrhage need not be feared, (5) the resulting astigmatism is negligible in quantity, (6) the statistics, up to the present, have shown the percentage of results superior to any one single method.

(6) **Peter,** of Philadelphia, compares the operations of iridectomy, cyclodialysis, and Lagrange's sclerectomy, with sclero-corneal trephining as perfected by Elliot. He finds the advantages of the latter over the other three are: (1) simplicity of *technique*, (2) absence of trauma to any of the vital parts of the eye, (3) the permanency of the drainage thus established, (4) its applicability to every case, regardless of the character or the stage of glaucoma.

Reaction, protracted although mild, after operation, he believes to be due largely to prolonged manipulation in teasing the conjunctiva from the cornea, and especially to the use of the hand trephine. Since using the von Hippel spring trephine, and more recently Reber's trephine driven by a dental engine, the reactions have been milder and of shorter duration. The cleanness of the trephine cut, is, in his opinion, one of the essentials of a successful trephining. With a mechanically-driven trephine, careful cleaning of the cornea from shreds of conjunctiva is not essential, and a filtering cicatrix is secured without splitting the cornea. Atropine is instilled after completion of the operation, and on at least three successive days following, "to prevent posterior synechiæ, from the quiet iritis which is sure to follow, whether an iridectomy has been performed or not." Stitching of the conjunctival flap is recommended. J. JAMESON EVANS.

(7) **Denig**, of New York, believes that trephining allows us to grasp the basis of the iris better than the von Graefe's operation, but owing to the danger of late infection after trephining, he favours iridectomy in all cases except simple and hæmorrhagic glaucoma.

He further recommends trephining with the formation of thick conjunctivo-episcleral flaps in glaucoma, secondary to iritis, and in detached retina (in preference to the usual scleral puncture). J. JAMESON EVANS.

(8) The paper which **Butler,** of Birmingham, contributes to the *Zeitschrift*, covers the same ground as an article upon the subject which appeared recently in THE OPHTHALMOSCOPE.*

(9) **Sym,** of Edinburgh, discusses a number of recent papers on the subject of trephining of the corneo-sclerotic junction, or "Elliot's operation." Sattler's views on the influence of rigidity of the sclera on the readings obtained with a Schiötz instrument are given, as also is the same surgeon's protest against the use of the term "inflammatory glaucoma." The explanations put forward by Orr and Wicherkiewicz on cases of glaucoma which occur in the absence of a measureable rise in tension, are mentioned; but it is not stated that, according to some observers, the tonometer reveals a rise in tension in such cases, even though such rise is beyond digital diagnosis. The *technique* of trephining is discussed. Sym says that "there appears to be a general consensus of opinion, although this is by no means universal, that in acute cases, iridectomy should still be the operation of choice, while the more purely chronic and non-congestive the case is, the more should one incline rather to trephining." Axenfeld's views are also given on this topic. Young's operation is discussed, but does not appear to appeal to Sym, who closes his article by saying of Elliot's operation, "there can be no doubt that we possess

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*THE OPHTHALMOSCOPE, June, 1914.

in it a method of high value in certain types of glaucoma, and that its introduction is one of the most important forward steps in the treatment of diseases of the eye which have been taken for many a day."

SYDNEY STEPHENSON.

(10). **Bourgeois** relates several cases to show the value of a cystoid cicatrix, and lays it down as a law that the value of iridectomy in glaucoma is directly dependent on the condition of the cicatrix that follows the operation. The tension remains uniformly low in the cases where a filtering scar results. The author quotes Holth and proceeds to show that by the introduction of his operation of iridencleisis, Holth attempted to produce this result.

Bourgeois, however, states that the possession of a cystoid cicatrix is not an unmixed blessing, and occasionally gives rise to troublesome subjective sensations. Patients complain that their lids catch against the projecting cicatrix, and they periodically demand that it should be cauterised. In one case such a filtrating scar had been successfully produced in a patient suffering from an attack of subacute glaucoma in the left eye. The resulting vision was good and remained so, but the patient complained bitterly of the annoyance caused by the protruding vesicle and worried considerably about it. When the right eye became affected with the disease, a simple iridectomy was performed under chloroform. A few days later a pretence was made of cauterising the cicatrix in the left eye. The patient was quite satisfied, and went away with about the same vision in each eye. Three or four years afterwards, the vision of the left eye remained the same, while that of the right was reduced to bare perception of light. Bourgeois therefore concludes that if he were so unfortunate as to develop glaucoma, after trying myotics, he would submit to a simple iridectomy under chloroform, and later to a sclerectomy, without which he would not feel himself secure. P. A. HARRY.

(11) The patient in this report by **Alexander,** of Scarborough, had already had one eye removed for glaucoma, and had suffered from many attacks of pain in the remaining eye. When seen, the tension was 2, and after iridectomy, it rose to 3. At the operation for repression of the lens, much vitreous was lost on puncture of the sclerotic ; after lengthened pressure on the cornea, the lens remained back, blood appearing in the anterior chamber ; for four months the tension has been a low normal, and there has been no return of pain. A. H. PAYAN DAWNAY.

(12) In the case reported by **Green** and **Hardy,** of St. Louis, trephining was performed for the relief of pain in an eye which was blind of old-standing glaucoma. The trephine was rather blunt, and the lens—as transpired later on—was wounded. The reviewer assumes that the principal feature of the case is that the eye became infected two months after operation, and was excised. In addition to the glaucomatous appearances observed *post-mortem,* "the capsule of the lens was ruptured at its superior aspect, and the corresponding part of the lens substance was infiltrated with round cells. Other portions of the lens showed areas of round cell infiltration lying in layers between the lens substance. . . . . The trephine opening was filled with connective tissue, round cell exudate, blood, iris pigment, and epithelium, the latter a downgrowth from the bulbar conjunctiva. . . . ." The authors do not indicate their views as to how the infection came about.

ERNEST THOMSON.

(13) **Abadie,** of Paris, is no believer in the present-day methods of treating glaucoma. He appeals to his very large experience for proof, or at any rate for the opinion, that the great thing is iridectomy. But in doing this iridectomy there must be no mishandling of the iris. The section must be cleanly made, the iris must not be pricked with the point of the keratome,

it must be handled with the utmost delicacy, and must be cut off with one snip of the scissors. If, however, we must have the more complicated modern operations of sclerectomy and sclerectomy with iridectomy, let us, in glaucoma, first try iridectomy alone, and reserve these other procedures for the cases which do not do well by simple iridectomy. In any case, sclerectomy and trephining are easier if the iris has first been dealt with.

ERNEST THOMSON.

(14) **Gradle,** of Chicago, lays down the following as the prognostic features upon which we should depend for indications of operative treatment, in cases of glaucoma simplex: (1) the curve of the intra-ocular pressure (tonometric); (2) the effect produced by definite limited massage on the intra-ocular pressure, and (3) the variations in the visual fields. He lays least stress on the last-named. In the event of an operation becoming necessary, he would attempt a cyclodialysis; should this fail, he would proceed to perform one of the operations whose avowed object is the formation of a subconjunctival fistula. His hesitation to resort earlier to a sclerectomy is based on his fear of late infections. He disagrees with Evans and Butler's recent defence of iridectomy in simple glaucoma; he does not find that operation successful in more than 50 per cent. of the cases. His classification of the operations of Herbert, Holth, Lagrange, and Elliot under one head as "sclerotomies" is unfortunate, but may be attributed to an oversight. R. H. ELLIOT.

(15) **Guglianetti,** of Naples, gives a detailed account of his experiences with 24 glaucomatous eyes in the operative treatment of which he followed Elliot's *technique*. A 1·5 mm. trephine was used; iridectomy, peripheral or complete, was usually included; the flap was rarely sutured. In five cases of simple chronic glaucoma the tension was reduced to normal, and in two the visual acuity and fields were improved. In one case of severe acute inflammatory glaucoma, two trephinings failed to reduce tension. In nine cases of chronic inflammatory glaucoma, pain ceased entirely after trephining. In three vision improved, in four it remained stationary, and in two it fell back. In three cases of staphyloma, the results were satisfactory. In two cases operated on for irido-cyclitis, failure resulted, whilst in two others, pain was relieved but tension remained slightly above normal. In one case only did he see any evidence of quiet iritis, and this was of short duration and gave little trouble. A. T.

(16) **Callan,** of New York, discusses the operative treatment of glaucoma. He holds that in the inflammatory forms of the affection surgical intervention is imperative, whilst even in the non-inflammatory forms, it is preferable to operate. In making a diagnosis, he places the factors to be considered in the following order: (1) the visual field; (2) the tension; (3) the optic nerve changes; and (4) the visual acuity. He reviews the various operations that have come before the profession, and discusses each in turn. He says that trephining has replaced Lagrange's operation, and that its results are so far satisfactory; it requires delicate manipulation in order to perform it, and must be carefully done in order to avoid button-holing. He has adopted Elliot's *technique*, and from personal experience, he believes "trephining has come to stay." But, in his opinion, it is not indicated in acute glaucoma, for which he advocates iridectomy. A. T.

XV.—REMEDIES.

(*Third Notice.*)

(1) **Brandès.—Chronic irido-choroiditis and salvarsan. (Irido-choroidite chronique et salvarsan.)** *Annales de la Société Médico-Chir. d'Anvers*, Vol. XVI., p. 189.

(2) **Terrien, F. and Prélat, P.—On ocular and auditory lesions observed after the use of salvarsan. (Essai de pathogénie des lésions oculaires et auditives observées après l'emploi du salvarsan.)** *Archives d'Ophtalmologie*, janvier, 1914.

(3) **Thomson, R. L.—Two useful remedies in the treatment of diseases of the conjunctiva.** *Ophthalmic Record*, February, 1914.

(4) **Uhle, Alexander A. and Mackinney, William H.—Salvarsan and neo-salvarsan in the treatment of syphilis, with special reference to diseases of the eye.** *Ophthalmic Record*, February, 1914.

(5) **Terson, A. — On the treatment of ocular syphilis. Internal medicaments. Mercury, iodide, frictions, suppositories, injections, grey oil, calomel, enesol, etc. (Sur le traitement de la syphilis oculaire. Médications internes. Mercure, iodure, frictions, suppositoires, injections d'huile grise, de calomel, d'énesol, &c.)** *La Clinique Ophtalmologique*, 10 août, 1914.

(6) **Selenkowsky, J. W.—The cure of the different forms of trachoma and of other diseases of the eye by radium. (Zur Frage über die Heilung der verschiedenen Trachomformen und einiger anderen Augenkrankheiten durch Radium.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(1) In a syphilitic patient affected with chronic irido-choroiditis, whose sight was reduced to faint perception of light, and in whom the fundus could not be illuminated, **Brandès**, of Antwerp, injected 40 c.gr. of salvarsan and prescribed mercurial inunction. Three days later, the patient could count fingers at one metre; seven days later, a second injection of salvarsan was given, and four days after this injection, the fundi could be examined with the ophthalmoscope, when the discs were found to be atrophic. Three days later, sight was 2/24 in one eye and 3/18 in the other. MARCEL DANIS.

(2) **Terrien** and **Prélat**, of Paris, report four cases in which ocular and auditory lesions followed shortly after the use of salvarsan. Briefly, the ocular lesions and their time of appearance were as follows:

Case I.—An optic neuritis associated with a slight attack of iritis occurring two days after injection.

Case II.—An attack of iritis associated with a neuro-papillitis which occurred thirty-five days after injection.

Case III.—A paralysis of the right external rectus three months after injection.

Case IV.—Well-marked neuro-retinitis in both eyes with slight iritis in the left occurring some two weeks after injection. The right eye recovered, but the left showed marked optic atrophy, with much diminution of vision.

From an extensive comparison of statistics of cases made before and after the introduction of salvarsan, the authors conclude that the lesions are not due to the drug but that they are of syphilitic origin in spite of its use. At the same time, however, they consider that it is quite likely that in some cases salvarsan may have an indirect action, *e.g.*, by driving the treponema from the skin and mucous surfaces towards the nervous system or that it may liberate a considerable quantity of syphilitic virus and thus give rise to symptoms of the involvement of nervous tissue at an early date.

A long list of references is appended, some sixty-five articles on the subject having been consulted. BERNARD CRIDLAND.

(3) The two remedies which **Thomson,** of Spokane, Wash., draws attention to are xeroform and tannic acid dissolved in glycerine. He recommends dusting of the conjunctiva with xeroform in vernal catarrh, pterygium, and trachoma. He claims that it is one of the best remedies he has ever used in the treatment of true trachoma. Tannic acid dissolved in glycerine, without the aid of heat, is the most effective remedy he has used for follicular conjunctivitis with pannus, and he has found it also valuable for ectropion with extensive thickening of the lower lids. J. JAMESON EVANS.

(4) **Uhle** and **Mackinney**, of Philadelphia, review their experience with Salvarsan in syphilitic diseases of the eye in fifty cases. In answer to the question "Does salvarsan accomplish enough to warrant its use in the treatment of syphilis?", they unhesitatingly answer in the affirmative. The only unpleasant effects they have noticed have been nausea, vomiting, flatulence and diarrhœa, toxic erythema with marked itching and a purpuric rash. The most important contraindication is nephritis, with the urine showing albuminuria and tubular casts. Its cautious use in small doses is permissible in simple albuminuria with cylindroids, when this may reasonably be regarded as syphilitic in origin. The urine should be examined, not only before the first injection, but also before each succeeding injection, as fatal anuria more frequently follows repeated injections. "If the kidneys are normal, if the dose is regulated according to the weight and age of the patient, and if freshly-distilled water is employed throughout, the solution being made for use immediately before administration, both salvarsan and neosalvarsan are safe drugs to employ." They have not been able to note much difference in the relative efficiency of salvarsan and neo-salvarsan. The intravenous method of administration is preferred.

The fifty cases of syphilitic diseases of the eye treated and followed up included one of chancre of the eyelid, ten of interstitial keratitis, twenty of uveitis, seven of muscular paralyses, four of optic neuritis, and seven of optic atrophy.

The Wassermann reaction was positive in 45, negative in three, and not recorded in two. The chancre recovered after one injection. The cases of interstitial keratitis gave a good final result within from two weeks to three months in all cases. In acute syphilitic uveitis the results were "astonishing." In muscular paralyses a consistent improvement was noted within a few days, and with one exception, normal function was restored within a few weeks.

In optic neuritis the results were uniformly good, the nerve clearing up within a month in all cases. No improvement occurred in cases of optic atrophy, but in two cases, associated with tabes, the pains were relieved and the gait and standing somewhat improved.

Mercury and iodides of potash were used very extensively in conjunction with the salvarsans, and no special merit is given to one over the other.

J. JAMESON EVANS.

(5) **Terson**, of Paris, while honouring Louis Dor for his recent report to the *Société française d'ophtalmologie*, considers that too much attention has been paid, not only in this report, but in current therapeutic practice, to Salvarsan and its successors. We have not all given up the administration of mercury by the mouth, nor yet the use of inunction.

From this the author goes on to state his views as to the least inconvenient methods (from the patient's standpoint) of using calomel and other drugs. We may transcribe something of what Terson says on this subject. "As to the everlasting question of gastric intolerance for many of the foregoing remedies, it can be overcome by a certain number of precautions at the moment of administration, by the dosage, the form of administration, and especially by the employment of "*globules glutinisés*," which are insoluble in the stomach. We *never* observe intolerance of sublimate, salicylate, or of quinine, when they are prescribed in this form. What numbers of patients give up the remedy and the physician, and rightly so, when they are ordered to take a remedy which causes gastric pain, interferes with their nutrition and with their occupation! We may leave potions to those who cannot swallow pills, especially 'painless' pills, but let us know how to profit by evident progress."

But, perhaps, even more interesting than this and much else in the article about the use of old-standing drugs, is a reference which Terson makes to an old author who seems to have anticipated much of what is now common knowledge. "In his report M. L. Dor rightly remarks that even mercurial treatment has not arisen altogether from empiricism, but also from the likeness of syphilis to parasitic diseases. I would ask my colleagues to read and even to obtain the *incomparable* book of Fracastor, "*De contagione, de contagiosis morbis et eorum curatione*," Libri III, 1546. We are not concerned with his poem on syphilis, a book in which he baptises the disease and in which many interesting details can be found, but which must not be confused with his book on *contagions*. In this last, which is *unique* in history up to Pasteur, everything is to be found, *infection*, word and idea, which is to be found in every line, infection by *germs*, living germs, which reproduce themselves and specifically inoculate the hitherto healthy individual; the differences between toxic diseases and infectious diseases; the complete theory of blood infection; along with logical treatment, the destruction of the germ, if possible, at its point of inoculation; then, the antisepsis of the blood aided by improvement of the natural defences and ejections. All this is detailed in a review of the chief inflammatory diseases; and there is even a long chapter on contagious phthisis. Almost nothing is wanting but illustrations of the microbes."

Where in this country can Fracastor's book be seen? Perhaps some bibliophile reader of THE OPHTHALMOSCOPE will reply.*

ERNEST THOMSON.

(6) **Selenkowsky,** of Petrograd, employs radium according to two methods. His first work was done with ten milligrammes of radium in a glass tube applicator, applied to the everted lid for a maximum period of ten minutes at each sitting. One or two applications per week were given, and the first effects were visible after two or three sittings. The effects were

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*A propos our reviewer's question, Mr. Charles R. Hewitt, librarian to the Royal Society of Medicine, London, informs us that Book I of "De Contagione" begins at folio 105 of the 1555 edition of "Fracastorius Opera Omnia." There is no separate edition of this work either at the Royal Society of Medicine or the Royal College of Surgeons Library, although both the College of Surgeons and the Royal College of Physicians have editions of the "Opera Omnia." That belonging to the former is dated 1591, and to the latter 1555 and 1584.—EDITOR.

most noticeable in the granular form without catarrh, and least marked in chronic trachoma with pannus and cicatrices. The glass tube absorbs all the alpha rays, and thus weakens the effect of the preparation. The second method involved the use of a plate-shaped applicator spread with ten milligrammes of 2,000,000 U radio-activity. This is a much more powerful preparation, since the alpha rays are allowed to pass. With it the maximum dosage was reduced to two minutes. As the result of his trials, Selenkowsky comes to the conclusion that for the quiet granular form the plate should be used, while for all other forms the glass tube applicator is preferable. In the majority of cases of trachoma, he has obtained satisfactory and lasting results.

With regard to other diseases, he obtained no good results in spring catarrh, but was satisfied with the disinfecting and healing effects produced in abscess and ulcer of the cornea. A. J. BALLANTYNE.

BOOK NOTICES.

School Lighting. By ELWIN H. T. NASH, D.P.H., Medical Officer of Health and School Medical Officer to the Borough of Wimbledon. London: J. and A. Churchill, 1905. 28 pp. Price 1s. net.

The *brochure* by Elwin H. T. Nash may be found of useful interest by those who are concerned with the designing of schools, and who wish to have the correct lighting arrangements. The little volume deals with the relation of window to floor area, the correct position for windows, and so on, and also, although less extensively, with artificial lighting. The text is illustrated by a large number of plans.

A Report of the Work carried out at the Radium Institute during 1914. By A. E. HAYWARD PINCH, F.R.C.S., Medical Superintendent. (Published with the Authority of the Committee.) 1915.

This well-printed and nicely put together *brochure* of fifty-two pages deals with the cases that have presented themselves at the Radium Institute, London, from January 1st, 1914, to December 31st, 1914, inclusive. Some of its contents are of particular interest to ophthalmic surgeons. Of all forms of malignant disease, rodent ulcer is the one that is most amenable to treatment by radium. Of 74 cases of that disease presented during the year covered by the Report, 41 were cured and 22 were improved. Of the 11 other cases, 2 were not improved, in 8 the results were not yet noted, and in 1 the disease was examined but apparently not actually treated. We are told that all rodent ulcers of the palpebral mucosa often respond well to exposures of strong unscreened apparatus of 15 to 20 minutes' duration given consecutively for three days. In the treatment of epithelioma, surgical measures are always to be preferred to radio-therapy when complete excision of the growth is practicable. A case of epithelioma of the cornea, however, is mentioned where no trace remained of the growth after one exposure of 50 minutes to a circular applicator, 1 c.m. in diameter, containing 10 mg. of radium. The only alternative to a cure by radium in this case would be by excision of the eyeball and perhaps exenteration of the contents of the orbit.

A wart, 0·5 c.m. by 0·3 c.m., on the outer surface of the lower eyelid of a man, aged 54 years, disappeared after an exposure of 40 minutes' duration with an unscreened flat applicator containing 7 mg. of radium. We gather from the Report that in spring catarrh the employment of radium is strongly to be recommended, as it will sometimes cure the most intractable cases. It is essential to proceed with great caution, giving short unscreened exposures at intervals of a fortnight, and carefully noting the reaction. A special form of applicator, which can be readily introduced into the conjunctival *culs-de-sac*, should be employed. If the dosage be accurately adjusted, the conjunctival granulations gradually disappear, there is no marked inflammation, and no resultant scarring of the mucous membrane.

It may not be generally known that patients, indigent or otherwise, are treated at the Radium Institute only in association with, and through the introduction of, their medical advisers. For well-to-do people there is a proper scale of fees. The address of the Institute is No. 16, Riding House Street, Portland Place, London, W. SYDNEY STEPHENSON.

NOTES AND ECHOES.

Deaths.

WE regret to announce the death of Dr. S. H. Habershon, which took place on February 26th, at the age of 57 years. He was the son of the late Dr. S. O. Habershon, once senior physician to Guy's Hospital, London. S. H. Habershon, although a general physician with a great leaning towards diseases of the chest and of the stomach, was keenly interested in ophthalmology. He was secretary of the Ophthalmological Society from 1894 to 1897, and served on the Council from 1897 to 1900. At the time of his death he was senior physician to the Hospital for Consumption and Diseases of the Chest, Brompton. He was perhaps most widely known from the circumstance that he was the physician of William Ewart Gladstone.

The death is announced of Dr. Pierre de Font-Réaulx, a member of the French Society of Ophthalmology, and oculist to the Prefecture of the Seine and to the Northern Railway Company of France. Death took place at Dunkerque, whither Font-Réaulx had been sent to look after wounded soldiers.

It is with deep regret that we announce the death of Captain H. R. S. Pulman, 3rd Battalion of the London Regiment (Royal Fusiliers), who was killed in action while leading his Company in the advance at Neuve Chapelle on March 10th. Captain Pulman was managing director of Messrs. G. Pulman & Sons, Limited, the printers and publishers of THE OPHTHALMOSCOPE from the first. A Memorial Service was held at St. James's Church, Piccadilly, on March 25th. It may be added that nearly fifty members of Messrs. Pulman & Sons' staff have joined the colours.

THE OPHTHALMOSCOPE DIARY.

1915.

Ophthalmological Society of the United Kingdom	April 22nd, 23rd, and 24th	London.
Royal Society of Medicine: Section of Ophthalmology	June 9th	1, Wimpole Street, London, W.
American Ophthalmological Society	July 6th & 7th	New London, Conn.
Oxford Ophthalmological Congress	July 15th & 16th	Keble College, Oxford.

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ORIGINAL COMMUNICATIONS.

A PEDIGREE OF HEREDITARY NYSTAGMUS.

BY

W. NICCOL, M.B.,

GLOUCESTER, ENGLAND.

DURING the last thirty years there have been recorded, under the name of "Hereditary or Congenital Nystagmus," a number of cases in which oscillation of the eyes was present, as an inherited characteristic, in individuals apparently otherwise normal. It is to the distinguished labours of the late Edward Nettleship, who collected and analysed these records, that we owe chiefly our present knowledge of the condition.

Nettleship published the results of his observations in his Bowman Lecture in 1909 (*Transactions of the Ophthalmological Society U.K.*, Vol. XXIX, Fasc. iii), and, later, in a communication to the Ophthalmological Society in 1911 (*Transactions Ophthalmological Society U.K.*, Vol. XXXI, Fasc. iii). From analysis of thirteen pedigrees he found that the affected families fell into two classes. In one class, the nystagmus was present in the males only, and the transmission was through the unaffected female, as in hæmophilia and Leber's disease (a male-limited inheritance). In the other class, individuals of both sexes were affected, and the descent was through either parent, although most frequently through the female. In this latter class the nystagmus was often associated with a rotatory movement of the head, whereas, with two exceptions, none of the cases in the male-limited class showed head-movements.

In the families on which Nettleship based his conclusions, consanguinity did not appear to be a factor, nor was there any history of organic nervous disease. The nystagmus seemed to date from early infancy, and in some cases, there was reason to believe, was present immediately after birth.

Examination of the affected individuals showed that nearly all suffered from large errors of refraction (mostly in the direction of hypermetropic astigmatism), and from a certain amount of amblyopia, the visual acuity being less than normal after correction with glasses.

Nettleship noticed, also, that in the majority of the "nystagmists," the irides were of light colour (grey, blue-grey, or light-brown) and the hair brown, with a history of having been fair or even white in childhood, and he regarded the nystagmus as being a symptom of a condition of partial albinism.

The following example of inherited nystagmus came under my notice at the Birmingham and Midland Eye Hospital in January, 1914:

The patient was a labourer, aged 54 years, who came for advice regarding an erythematous condition of the eyelids. The striking feature which he presented, however, was a continuous oscillation of the eyes. This movement, he said, had been present ever since he could remember; also several other members of his family "worked their eyes" in a similar fashion, having inherited the peculiarity from their grandfather.

The nystagmoid movements were regular, rather slow, horizontal, and concomitant, and slightly increased in rapidity in the extreme lateral positions of the eyes. On ophthalmoscopic examination, twitching of the lids was produced, which increased and finally became accompanied by "shaking" movements of the head. His vision was much below normal (6/36 partly in each eye). This seemed to be due to myopic astigmatism which was present, but correction with glasses gave improvement up to 6/18 only in each eye.

The hair was rather dark, but was said to have been decidedly fair in his youth, and he still had rather fair eyebrows and moustache. The irides were light blue-grey.

Fundal lesions were present in this case, *viz.*, one or two small patches of choroidal atrophy close to the macula in each eye. None of these was exactly central. In spite of the nystagmus, it was found possible to map out these areas by means of a Priestley Smith scotometer, although the blind areas thus charted were doubtless larger than they would have been had the eyes been steady.*

This man was of rather poor *physique*, was said to suffer from chronic bronchitis and dyspepsia; but there was no evidence of any organic nervous disease. He had never worked as a miner. The movements, he said, caused him no inconvenience as a rule. He was perfectly unconscious of them, and objects appeared to him to be quite steady.

By the kindness of Mr. Eales, of the Birmingham Eye Hospital, I have been able to investigate this man's family history. He is resident in one of the suburbs of Birmingham, and the family is peculiar in this respect: that practically all the individuals shown in the genealogical "tree" have lived in this district all their lives, and are, or have been, well-known to each other. This circumstance has added to the accuracy of the information I have been enabled to gather.

A general survey of the accompanying table shows that this family belongs to the second of Nettleship's groups of hereditary nystagmus, *viz.*, that in which the nystagmus is present in individuals of both sexes, and is transmitted by either parent. Here also head-movements accompany the condition in many of the cases. I have had the opportunity of examining 14 individuals of this family, of whom 9 were affected and 5 unaffected, and I have collected information regarding 138 individuals of the stock (six generations in all).

With the full interpretation of the pedigree in its relation to the Mendelian hypothesis, I am not competent to deal, but it is necessary to draw attention to some features which the accompanying "tree" presents. Of course, little reliance can be placed on conclusions based on so limited a number of individuals, but the following facts may be noted for what they are worth:

In the five generations II-VI there are 137 sexed individuals, of whom 65 are males, 72 females. Of this 137, 20 are affected with nystagmus, of whom 12 are males, and 8 females. Now, in the pedigree, there are 12 parents who have transmitted the condition to their children. Of these 4 are males, all themselves affected, and 8 are females, of whom 5 are unaffected. There is no instance of an unaffected male having transmitted the condition. In other words, the condition, although occurring in both sexes, bears a strong resemblance in its mode of descent, to the sex-limited diseases—it appears in the male more readily than in the female, but is transmitted most often by the female, who, moreover, is frequently unaffected herself.

Furthermore, the female tends to transmit the character to her sons, and the male to his daughters, exactly as occurs in the sex-limited diseases. In this pedigree the transmission is :—

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* I do not think these fundal changes bore any relationship to the nystagmus, as this was the only instance in which I found such lesions in a "nystagmist."

From father to daughter in 6 cases.
From mother to son in 12 cases.
From mother to daughter in 2 cases.
(In no case from father to son).

The mode of descent in the sex-limited diseases can be explained to a certain extent on the assumption that the variation behaves as a dominant characteristic in the male, and as a recessive in the female ; in which case a female showing the peculiarity must be homozygous, and should transmit the character to all her sons (Bateson : "Mendel's Principles of Heredity," p. 173). This has been found to hold good, for example, in the case of colour-blindness. But in the present pedigree of nystagmus this explanation does not help us much, for here a female exhibiting nystagmus may have normal sons (Cases IV 5, IV 14, and VI 2), and an unaffected female may have an affected daughter. One must believe that there is here some additional factor present, probably a factor intimately connected with sex-determination.

Generation II, it will be seen, contains no instance of nystagmus, the "disease" skipping a generation—a phenomenon noted in some of Nettleship's cases. In this pedigree there may be some room for doubt on this point, but I have it on the emphatic testimony of one individual (III 5) that none of her mother's family were affected. In this woman's case, too, it will be noted that neither she nor any of her descendants in the next two generations have shown nystagmus, and it is tempting to conclude that this woman is "pure for the absence of nystagmus," and that her descendants are therefore freed from the defect altogether.

Of the 21 nystagmists in this pedigree, 20 are living, of whom I have examined 9. The members of the family are all well aware of the existence of the peculiarity, and have noted that the nystagmus is present, in some cases at least, a day or two after birth. One patient told me that, in the case of her boy, *æt.* 5 (V 18) the doctor remarked on the day following his birth that he "shook his eyes like his mother."

In all the nine individuals examined, the nystagmus was horizontal and concomitant. It varied in rapidity, but was in most cases a rather slow, irregular nystagmus. In two cases (IV 21, and her son V 18) the movements consisted of a rapid jerk to the left, followed by a slower return to the primary position. In both these cases the nystagmus was increased in the left lateral position of the eyes, and diminished in the right. In both cases also the patient had a tendency to hold the eyes slightly turned to the right, the head being turned slightly to the left, and the older patient stated that when she looked to the left all objects appeared in motion. This attitude of the "nystagmist" (the head turned to the left, the eyes to the right) has been noted by others, and it has been conjectured that the position adopted is connected with right-handedness. In the two cases in question, however, it is clear that this position is adopted because it is the one in which the eyes are steadiest.

Several others of the examined (Cases III 17 and IV 36) had an exactly similar irregular nystagmus, but in others the nystagmus was regular, in some of whom it was increased in both lateral positions. In none of the cases was the nystagmus increased on elevation of the eyes in the manner described by Llewellyn for eliciting the movements in miners' nystagmus.* The patients were all quite unconscious of the movements unless they were exaggerated by the eyes being turned to one side, or, in the case described above, by ophthalmoscopic examination, and objects appeared to them quite steady.

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* "Miners' Nystagmus."—Llewellyn.

In all cases not examined the nystagmus was said to be horizontal.

Head-movements.

In three of the nine examined, head-movement was present on examination, and two of the others were said to show similar movements at times, when excited or looking intently at anything. In the remaining four it was said to be absent, and in three of these it is noteworthy that the nystagmus was very slight.

Of the eleven other " nystagmists " not examined, head movements were said to be present in six, absent in three, and in the case of the other two nothing on this point was known. The head movements, unlike the nystagmus, were said to appear after the child was a few months old, and then, although they remained through childhood, tended as the individual grew up to become less marked and to disappear. I was told, on the other hand, that the nystagmus never improved.

The head movements, like the nystagmoid ones, were horizontal (" negation " movements). Beyond these facts I could establish no relationship between the two.

Vision and refraction.

The vision and refraction under homatropine were estimated in eight nystagmists and four normal individuals. The results are very striking, and are shown for comparison in Tables Nos. I. and II. In all the affected individuals the vision is much reduced, and there is considerable ametropia. Also in no case was vision much improved by glasses. On the other hand, of four unaffected individuals examined, all had vision practically normal, and any refractive errors present were small.

All the cases were carefully examined with a view to finding evidence bearing on the question of albinism. It must be admitted that this yielded very meagre results.

The colour of the hair and eyebrows was noted as dark, medium, or fair. These facts, with the colour of the irides and the fundal appearances, are noted in Table No. III. Seven of the nine cases noted seem to have been fair as children, and some of them could be described as fair still.

One boy with marked nystagmus and head-movements (Case V, 18) had reddish-brown hair, with fair eyebrows and light-brown irides, and his mother gave the history that he had as an infant been very fair.

In two cases it will be seen the fundi are noted as light-coloured (Cases IV 27 and 36), but this was nothing more than is commonly seen in persons of fair complexion.

In answer to enquiries regarding individuals not seen, I was told by one patient (III 7), that his brother (III 9), who died at the age of ten, was very fair; his hair "was almost white." He is said to have had good sight, however, and no nystagmus.

The results of examination of several normal individuals of the pedigree are given in Table No. IV.

TABLE NO. I.

AFFECTED INDIVIDUALS.

No. of Case.	Vision.*	Refraction.	Vision after Correction
III 7	R [illegible] λ	— 2 — 1 cyl. at 105°	[illegible]
	L [illegible] λ	— 2·50 — 1·50 cyl. at 74°	[illegible]
IV 21	R < [illegible]	— 6	[illegible]
	L < [illegible]	— 6 — 1 cyl. at 180°	[illegible]
V 18	R [illegible]	+ 2 cyl. at 180°	[illegible]
	L [illegible]	− 1 + 1 cyl. at 180°	[illegible]
IV 26	R [illegible]	+ 1	[illegible]
	L [illegible]	— ·50 + 1 at 120°	[illegible] λ
III 17	R [illegible] λ	− 1·50 cyl. at 120°	[illegible]
	L [illegible]	+ ·50 cyl. at 180°	[illegible]
IV 36	R [illegible] λ	+ 3·50 cyl. at 105°	[illegible] λ
	L $\frac{6}{24}$	+ 3·50 cyl. at 75°	[illegible] λ
IV 27	R [illegible] λ	− 4 + 1 cyl. at 30°	[illegible]
	L [illegible]	− 3 + 1·50 at 15°	[illegible]
V 1	R [illegible]	+ 1·50	[illegible]
	L [illegible]	− ·50 + ·50 cyl. at 90°	[illegible] λ

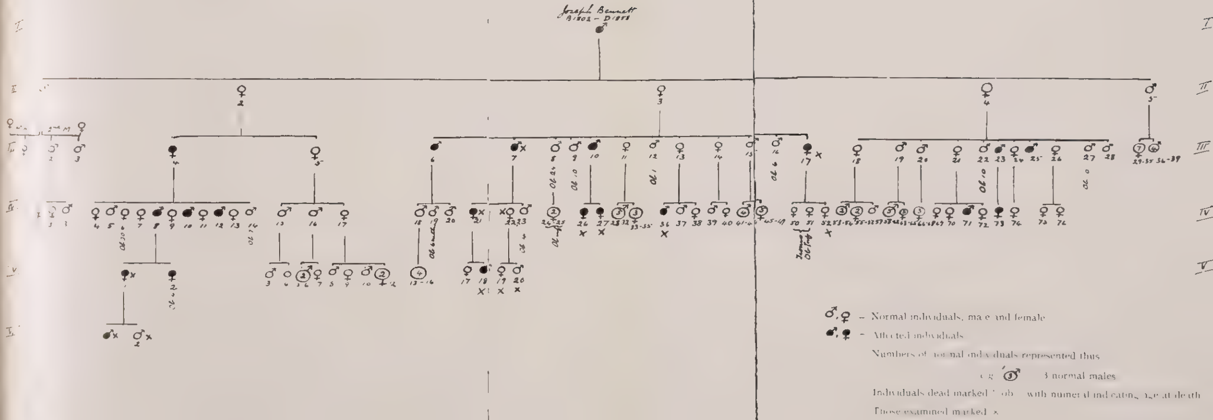
TABLE NO. II.

UNAFFECTED INDIVIDUALS.

No. of Case.	Vision.*	Refraction.	Vision after correction.
V 20	R $\frac{6}{6}$	+ ·50 cyl. at 90°	$\frac{6}{6}$
	L $\frac{6}{6}$	+ ·50 + ·50 cyl. at 90°	$\frac{6}{6}$
IV 52	R $\frac{6}{6}$	Emmetropic	$\frac{6}{6}$
	L $\frac{6}{6}$		$\frac{6}{6}$
V 19	R [illegible] λ	+ 2 + ·50 cyl. at 180°	$\frac{6}{6}$
	L $\frac{6}{6}$ λ	− 2	$\frac{6}{6}$
IV 22	R [illegible] λ	Emmetropic	$\frac{6}{5}$ λ
	L [illegible] λ		$\frac{6}{5}$ λ

*λ = "partly."

A PEDIGREE OF HEREDITARY NYSTAGMUS



♂, ♀ – Normal individuals, male and female

●♂, ●♀ – Affected individuals

Numbers of normal individuals represented thus

e.g. ③♂ 3 normal males

Individuals dead marked "ob." with numeral indicating age at death

Those examined marked x.

TABLE NO. III.

AFFECTED MEMBERS.

Case No.	Age.	Hair.	Eyebrows.	Irides.	Fundi
Case III 7	54	Dark ; fair in youth	Fair	Blue-grey ; almost devoid of pigment	Patches of choroidal atrophy
Case IV 21	35	Medium ; fair in youth	—	Blue-grey ; a few spots of pigment	Of normal hue even at periphery
Case V 18	6	Reddish-brown ; fair as a baby	Fair	Light brown ...	Normal hue
Case IV 26	25	Dark ; said to have been fair in childhood	Dark	Light brown ...	Tigroid
Case III 17	31	Medium-fair ; very fair in childhood	Fair	Blue-grey	Normal hue
Case IV 36	18	Medium-dark ; very fair as a child	Medium	Blue-grey	Rather light reflex ; choroidal vessels visible at parts on light interspaces
Case IV 27	24	Medium	Fair	Grey, with a few spots of brown pigment	Choroidal vessels very definite light interspaces
Case V 1	23	Very dark (father fair, mother dark)	Black	Medium brown ...	Dark tigroid fundus
Case VI 1	2½	Dark at birth ; now medium	Medium	Medium brown ...	--

TABLE NO. IV.

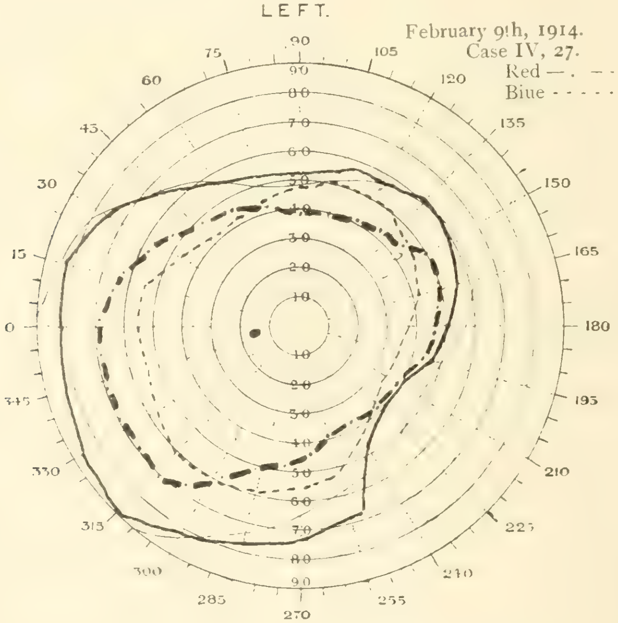
NORMAL MEMBERS.

Case No.	Age.	Hair.	Eyebrows.	Irides.	Fundi.
Case V 20	10	Medium	Medium	Grey	Normal ; choroids not light
Case IV 52	10	Medium-fair ...	Fair	Blue-grey with some brown spots of pigment	Normal ; inferiorly choroid rather light
Case V 19	11	Dark	Medium	Grey with numerous brown pigment spots	Choroids pale with vessels showing distinctly
Case IV 22	33	Dark	Dark	Blue-grey with scanty pigment	Normal

Visual Field.

The examination of the field of vision is of doubtful value in an individual who has continuous well-marked oscillation of the eyes. However, in three "nystagmists" it was found possible to map out the peripheral limits of the fields for white, blue, and red with a 10 mm. object, and also to define the blind spot and explore the central part of the field with a 2 mm. object. The objects appeared to the patients to be steady, and their answers were definite. With the exception of one case, where I have said that choroidal atrophy was present, no defect of the central part of the field was found.

The boundaries of the field were of normal extent, but there was interlacing of the fields for blue and red in all three cases. What the significance of this is it is difficult to say, but the colour fields extend well out in all meridians: there is certainly no diminution in the sensitiveness of the peripheral parts of the retina.



February 9th, 1914.
Case IV, 27.

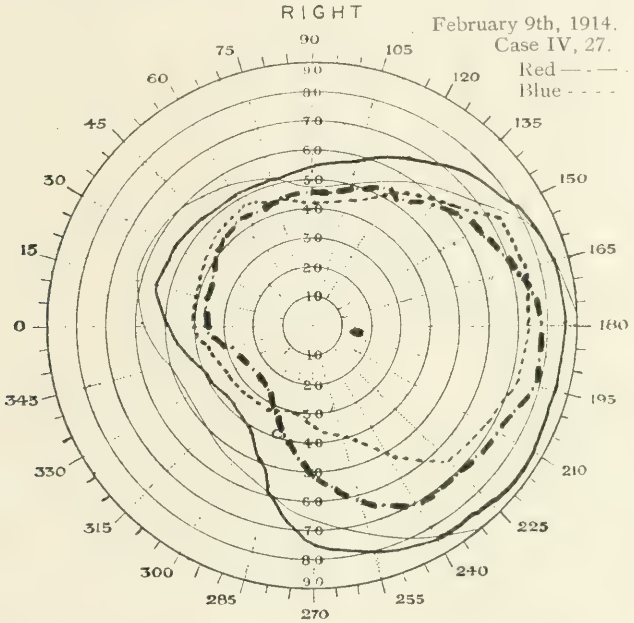
Central vision for colours appeared to be normal in all nine "nystagmists." Night blindness was enquired for in every case, but was not present in any. Case III 7, described above, thought he saw better at dusk, probably because of the scotomata near the fixation points.

Comments.

This pedigree of hereditary nystagmus seems to me of value, not only in furnishing additional evidence of the soundness of Nettleship's conclusions, but in showing particularly that the cases of hereditary nystagmus with head movements are related to the male-limited class, and will probably be found eventually to conform in their mode of descent with the Mendelian laws.

The results of the clinical examination of the eyes in my cases may be summed up by saying that there is defective central vision, associated with, but not entirely caused by, ametropia. In every other respect the eyes appear to be normal. If there is any anatomical defect present, one would expect it to be a defect at the macula.*

The existence of head-movements with the nystagmus I believe is merely evidence of the extent to which the centres for associated movements are affected by the lack of accurate visual stimuli. This view, I think, gains some support from the evidence in my cases, where, in one instance, the dazzling effect of ophthalmoscopic examination caused the disturbance to spread from the eyes to the muscles of the lids, and finally, to those controlling head movements; while in other cases, head movements were said to be brought out by the patient looking intently at anything.



February 9th, 1914.
Case IV, 27.
Red — - — -
Blue - - - -

As regards the evidence of defective pigmentation, all that can be said is that a majority of the "nystagmists" examined were of rather fair complexion. There was no definite evidence of defective pigmentation of the retina or choroid in any case.

The "nystagmists" are individuals otherwise normal. They are of average *physique* and intelligence. In all cases, examination of the knee-jerks, gait, etc., failed to show any sign of organic nervous disease.

The family history shows that there is a tendency to phthisis. Three deaths were definitely attributed to "consumption," and many of the other individuals were said to suffer from bronchitis and "weak chests." The "nystagmists" however, appear to be as healthy as the others and frequently live to old age.

One child in the pedigree is said to suffer from infantile paralysis, but there is no other instance of organic nervous disease.

There is no instance of a consanguinous marriage.

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*Usher, in 1912, reported a case of congenital nystagmus in which a microscopic examination of the retina showed that there was no proper fovea, and a few ganglion cells were present in this region. There was no evidence of lack of retinal pigment. (*Royal London Ophth. Hospital Reports*, Vol. XVIII, Part iii.)

PROGRESSIVE OPTIC ATROPHY AFTER FRACTURE OF THE BASE OF THE SKULL.

BY

A. DE KLEIJN, M.D.

UTRECHT, HOLLAND.

LITTLE is as yet known about remote affections of the optic nerve following fracture of the skull. If we consider that the cause of these is principally to be looked for in a fracture in the region of the optic foramen, it need not cause wonder that in some of these cases a formation of callus may appear which may secondarily affect the optic nerve, either by direct pressure or by disturbances of the blood-circulation. That this happens so seldom in reality, must partly be ascribed to the shifting of the broken parts being so insignificant, and partly to the varying tendency towards callus formation in the different parts of the body, the cause of which we do not yet understand.

Some time ago it was possible to examine a case of progressive atrophy of the optic nerve after fracture of the skull more accurately, and to publish the facts.*

A second case belonging to this class has been recently observed in a detained Belgian soldier, who was nursed in the military hospital in Utrecht. The facts are as follows :

History.

The patient, 19 years old, a Belgian soldier, was hit with the butt-end of a rifle on the back of his head or the nape of his neck between the 13th and 15th of August, 1914, during the retreat from Liége. He is said to have been rendered unconscious by the injury for about four hours. After the accident, he lost blood from his mouth for many days. Since that time, he has continually complained of left frontal headache and pain in his left cheek. At first his neck also ached, but this disappeared after the exhibition of aceto-salicylic acid.

At first the patient could see fairly well with the left eye, although the visual acuity grew continually smaller than in the right eye. He was detained in Holland until the 10th of October, and could then with the left eye still recognise his friends at three metres. During the early days of December, the acuity of this eye had sunk to light perception only, according to the information of the medical man who treated him. Now that eye is blind. His right eye, according to the patient himself, is quite sound. His general health has always been good ; no syphilis or other venereal disease.

Status Præsens.

Internally.—No anomalies. Urine contains no sugar or albumen. Wassermann reaction negative.

Neurological.—Sensibility, mobility, and reflexes normal. Trigeminus I and II at the left side, on the typical spot, very painful on pressure.

Rhinological, etc.—No anomalies, with the exception of a slight deviation of the septum to the left, and a remainder of adenoid tissue in which centrally a deep crypt is to be seen. Smell : present at both sides, certainly no anosmia, perhaps some diminution. Statical organ : quite intact (caloric and galvanic nystagmus). Acoustical organ : drums intact, whispered voice at both sides normal, on examination with tuning-forks ; no anomalies.

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* De Kleijn.—*Archiv für Ophthalmologie*, Vol. LXXXVII, 20 January, 1914, p. 154.

Röntgen photograph.—On the successful plates taken by Dr. van der Minne no anomalies are to be seen (photographs taken bi-temporally and fronto-occipitally).

Condition of the Eyes, 10*th December.*—R.V. 5/5, emmetropia ; L.V. no perception of light. On fixation with the right eye, the left sometimes makes irregular movements. Tension normal on both sides. Media clear, except for some maculæ of the cornea. No nystagmus. Reaction of the pupil on right side intact, directly and indirectly, to light and to convergence. In the left eye reactions of the pupil also present, although in a lesser degree (notwithstanding the absolute blindness). Discs somewhat paler than normal, sharply limited, vessels, especially arteries, on the left side narrower than on the right. In left fundus a few foci of pigment spread irregularly. No central scotoma.

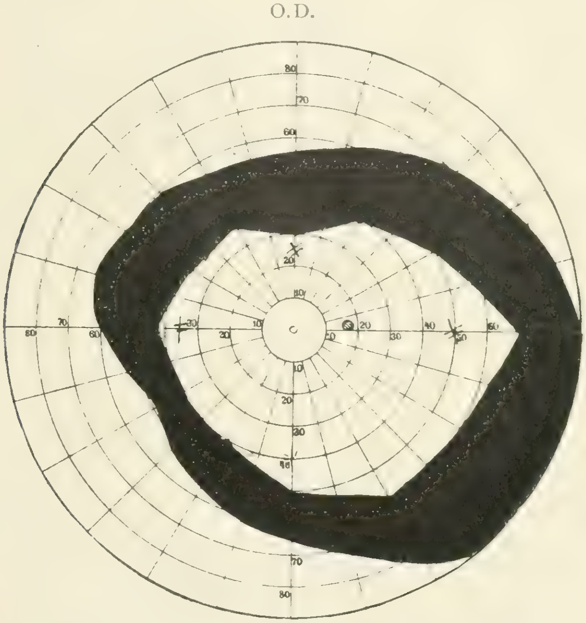

Fig. I.

10 Dec., 1914.—Test object 15 × 15 mm. ± green.

Visual Fields (see fig. I).—On December 10th, 1914, examined with a test object of 15 mm. × 15 mm., the blind spot appears vertically 30°, horizontally 10°, greatly enlarged. For colours : red = white, only temporarily 60° instead of 70°.

18*th December.*—Condition as above, only field of right eye much smaller (see fig. II). For colours the field is smaller still, for red even everywhere within 10°.

27*th December.*—The patient complains of pain round his right eye. Vision of right eye 5/10, visual field for white (see fig. III), colours all within 10°.

O.D.

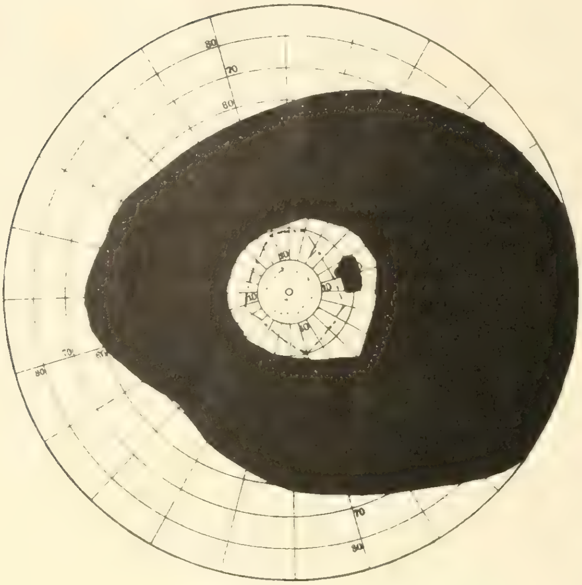

FIG. II.

18 Dec., 1914. Test object 15 × 15 mm.

—.—. blue.
.... red, green.

N.B.—Test objects 3 × 3 mm. : Visual field for white everywhere < 10°.

O.D.

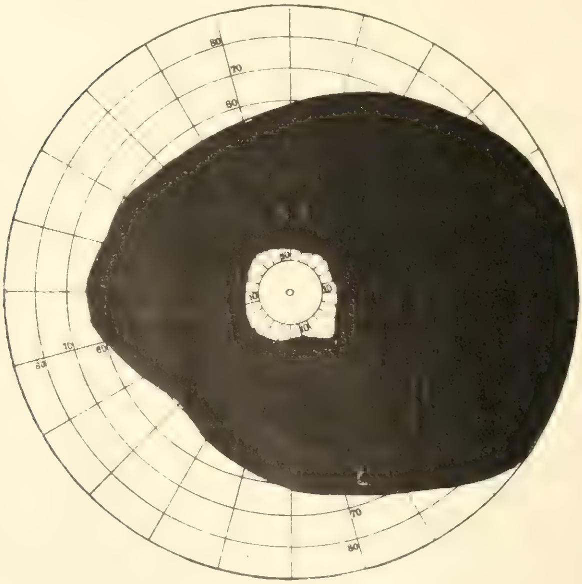

FIG. III.

27 Dec., 1914.—Test object 15 mm. : Visual field for colour < 10°.

All the fields were taken with the lampimeter as well as with the perimeter, and the results in the different meridians were controlled once after the examination, so that functional disturbances are at least improbable. The fields mentioned above represent but a few out of a series: they clearly show the progress of the optic atrophy.

A few words should be said about variations of the fields, observed on different days. Sometimes it happened that one day the fields were found somewhat larger than on a previous day. This might indeed be expected, considering the probably important *rôle* played by disturbance of the circulation in the causation of the narrowing of the fields. As these disturbances may vary considerably, the fields may also show differences on various days. Compare the great daily variations of the fields in tumours of the pituitary body.[*] Examination at greater intervals, however, showed the growing contraction of the fields.

Epicrisis.

A patient sustains a severe blow on the back of the head, accompanied by unconsciousness and bleeding from the mouth. A slowly progressive optic atrophy on both sides follows, without any sign of inflammation. No neuralgia is complained of, nor are any nasal anomalies to be found. At the same time there is considerable painfulness of the trigeminus I and II on the left, and pain round the right eye later on.

Although the skiagram reveals no anomalies,[†] the most probable cause is a formation of callus in the neighbourhood of the optic foramina.

Finally, we may point to the desirability of prolonged observation, especially of the fields, in cases of fracture of the skull.

MEMORANDUM.

TURKISH CLEARING HOSPITAL.

BY

A. F. MacCallan, F.R.C.S.
Cairo, Egypt.

In response to an offer by the Department of Public Health to assist in the medical arrangements in the war, it was decided by the Director of the Army Medical Service in Egypt to accept two camp hospitals for service with the troops stationed along the line of the Suez Canal for the defence of Egypt. The functions of the hospitals were to be those of clearing stations, where immediately urgent operations only are done, but where all wounds are dressed and all wounded prisoners fed.

The organization of two hospitals with their staff was commenced on January 27th, and equipment and staff were despatched on the following day to Ismailia and Suez. The equipment and staff were drawn from the ophthalmic hospitals belonging to various Provincial Councils by permission of the Presidents of the Councils of the Provinces of Gharbia, Assiut, and Daqahlia. The requisite equipment for general surgical work, as opposed to ophthalmic surgery, was prepared and despatched with great rapidity by the Central Stores of the Department of Public Health.

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[*] de Kleijn.—*Archiv für Ophthalmologie*, Vol. LXXX, 7 November, 1911, p. 307.

[†] It is a well-known fact that such small anomalies of the skull cannot generally be recognised in a Röntgen photograph.

Owing to a misunderstanding by the local military authorities, the whole equipment was despatched to Suez, and that intended for the Ismailia Hospital was not returned to Ismailia from Suez until the evening of February 2nd. Congestion of traffic at Ismailia Railway Station delayed the arrival of the equipment at the site chosen for the camp by Captain Thomson, R.A.M.C. However, by working extremely hard, Dr. Kennedy and his staff managed to get the tents pitched by 6 p.m. on February 3rd, at which time a batch of thirty-three Turkish wounded was brought in. Surgical assistance was obtained from the New Zealand Expeditionary Force, and all the wounded were dressed and given food by 2 a.m. February 4th; they were despatched to Cairo by the morning train. On the same day ten Turks were sent to the hospital, and on the following day sixty-eight. The arrival of this number arriving almost immediately after the despatch of the previous batch kept the staff busy until 4 a.m. February 6th, and preparation had to be begun for their despatch at 6 a.m. Enough has been said to show that the hospital has played a useful and necessary part. The total number of patients who have passed through the hospital being 116.

The hospital now consists of two operating tents fitted with electric light, beds for 100 patients, and lying-down accommodation for several hundred more in case of emergency. There are three medical officers and a full staff of the employés. The Suez Hospital is under the charge of Dr. Oulton, with one medical officer. It has beds for fifty patients and plenty of lying-down accommodation.

The staff of the two hospitals is eager for work, and will be disappointed, both from a national and surgical point of view, if their services are not again required.

REVIEW.

THE INTRA-OCULAR PRESSURE AND THE TENSION OF THE EYE.

BY
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Continued.

PART II.

On the Effect on Intra-ocular Pressure of the Continuous Flow of Fluid through the Chambers of the Eye.

THERE is a statement which has been so often repeated unchallenged, that it is in danger of being accepted without due examination, *viz.*, that the pressure in the aqueous and vitreous chambers is the same throughout. Let us first look at certain facts which are not likely to be disputed by anyone. The fluid which fills both chambers of the eye is secreted or transfused from the ciliary body ; we need not now enter into the question whether this is a true secretion or a transfusion, as it does not affect the point at issue. This fluid again passes out of the chambers of the eye and back into the blood-vessels in the neighbourhood of the angle of the anterior chamber, and (probably in a decidedly lesser degree) through the crypts of the iris. Whether the escape of the fluid is due to the pull of osmosis, or to the push of pressure, is immaterial to our present argument. So far we are on indisputable ground. The very fact that there is a flow argues that there is a difference in pressure, which is at its maximum in a comparison of the area of secretion (using the term without prejudice) with that of excretion. In other words, the highest pressure must obviously be at the area of secretion and the lowest at that of excretion, whilst between the two there is a gradual fall. The difference is so slight that no instrument yet devised has been able to detect or to measure it. Nevertheless, the first principles of hydrodynamics assure us of its existence. If a simile might be permitted, it would be that of a man standing at the edge of one of our large reservoirs, into which water enters at the sides, and from which it leaves by one or more funnel-opening surface pipes near the centre. To the careless spectator there is a sheet of what appears to be still water ; but a closer observation will satisfy him that the fluid is entering the tank at the sides, and leaving it at the centre. A slight movement of the water at the centre and sides assures him of this, and he therefore knows that there must be a difference of level between the two ; the centre must be a little lower than the sides, and yet apart from the movement of floating objects he might find it impossible either to demonstrate or to prove this in such a way as to satisfy one who did not share his knowledge of the laws of moving water. How much more difficult would it be to take points between the two extremes and to demonstrate the difference of level between them, and yet it exists along every inch of the whole stretch of water. To apply the simile, the difficulty—nay, the impossibility—of demonstrating a difference of level between the different parts of the interior of the eye does not for a moment weaken our absolute confidence that such a difference exists. We have but to remember that only about 5 c.mm. of aqueous leave the eye in a minute, and that it probably takes about 48 minutes to excrete the small amount of fluid found at any one moment in the anterior chamber, and we can then easily realise how extremely slow the flow of the nutrient fluid of the eye must be, and how little chance we have of being able to measure it by so crude a method as a manometric estimation of the pressure in the chambers of the eye. None the less we believe that fluid is poured out from the ciliary body into the anterior portion of the vitreous chamber, and into the periphery of the posterior division of the aqueous chamber, and that it then makes its way, owing to a slight difference of level, through the pupil to the angle of the anterior chamber, from whence it effects its escape. That the current may be immeasurably slow does not affect the argument one jot; there *is* a difference of pressure and there *is* a current, and the direction of the latter is as already indicated.

Now, Priestley Smith has established experimentally the fact that the same sequence of events (*viz.*, pushing forward of the diaphragm of the eye, shallowing of the chamber and obstruction of the angle of excretion), with which we are familiar in acute glaucomatous attacks, will follow if we raise the pressure in the vitreous chamber above that which is present in the aqueous chamber. It may be said that the differences in pressures with which he worked were probably in excess of those which exist in the eye, though in the necessary absence of manometric observations of glaucomatous eyes, we cannot certainly affirm that this is so. The important point is that we know from these experiments what will happen if the pressure in the vitreous chamber rises above that in the aqueous chamber, and we also know that such a difference in the two pressures can be established, by artificial means at least.

If the above premises are conceded, and it is difficult to understand how they can be disputed, we may pass on to a practical application of the knowledge so gained. In glaucoma, especially if acute, we meet with a shallowing of the anterior chamber, which is evidently due to a pushing forward of the diaphragm of the eye. The obvious explanation would appear to be that there has been an accumulation of fluid in the vitreous, as compared with that in the aqueous chamber. There is strong clinical evidence in support of this interpretation of the phenomenon, for the performance of an iridectomy in a case of acute glaucoma can be made both safer and more easy by the performance of a preliminary sclerotomy. In this operation, a knife is passed, through the sclera, into the posterior chamber of the eye, and is then rotated in such a way as to allow of the escape under the conjunctiva of some of the imprisoned fluid. If we are content to wait for ten to fifteen minutes we find that the tension of the globe falls, and the anterior chamber deepens; at the same time we observe that fluid passes out from the eye through the puncture and accumulates under the conjunctiva. The explanation which naturally suggests itself, and which is of course by no means new, is that the release of fluid from the vitreous chamber has in some way re-opened the usual channels of communication between the vitreous and aqueous chambers, and possibly has at the same time opened up the channels of excretion of fluid from the eye. It would appear that the normal condition, in which the difference in pressure between the anterior and posterior divisions of the eye is present but immeasurably small, has been again restored in the place of the abnormal state which was represented by an overfilling of the vitreous as compared with the aqueous chamber.

We start then with the clinical observations (1) that the first incident in the development of an acute glaucoma is most frequently a distension of the vitreous chamber at the expense of the aqueous chamber, and (2) that the *status quo* can often be restored by letting out a few drops of fluid from the over-loaded vitreous reservoir. It is much more difficult to carry the matter a stage farther on, in the attempt to find a solution to the questions: how is this distension brought about? and how does the tapping of the posterior chamber of the eye produce the effect we have seen it does? It is necessary to seek a solution of these problems. Before doing so, however, it is desirable to remind ourselves of certain elementary physiological facts. The secretion (using the term without prejudice) poured out by the ciliary body is believed to find its way by two main routes, *viz.*, (1) more or less forward into the posterior division of the aqueous chamber, and (2) backward into the vitreous body. The fluid from the latter stream eventually finds its way forward through the suspensory ligament to join the anterior stream in the posterior division of the aqueous chamber, from whence the united volume of fluid is directed forward through the pupil, on its way to the angle of the anterior chamber, and to the crypts of the iris. This fluid, in its passage forwards from the vitreous body, must traverse what we may call "the straits" of the perilental space. Priestley Smith has shown how these straits may be closed to its passage by the growth in bulk of the lens on the one shore, and by the swelling of the ciliary body on the other. When this happens the fluid continuity of the vitreous and aqueous chambers is interrupted, and a relatively impervious diaphragm is then stretched across between the two reservoirs of fluid. Assuming that his data are correct, it requires little imagination to see what will follow. He has elaborated the argument (in his book on Glaucoma, p. 130), and has there cited other possible factors in the production of the obstruction to the flow of fluid. If we can accept his views, we find a ready and simple solution of our problem. Even if we do not accept them, other ways in which the circum-lental straits can be blocked readily suggest themselves. The obstruction may be brought about by a change in the degree of permeability to fluid of the superficial layers of the vitreous body, of the hyaloid membrane, or of the suspensory ligament. Also, there are those who think that an altered constitution of the fluid which finds its way into the vitreous body, under glaucoma conditions, may lead to a change in the osmotic power of the vitreous, and so to a swelling of this jelly-like structure. The objection has been raised that on the first principles of hydrostatics, it is not possible to have a difference in pressure in different parts of the fluid mass in a closed cavity. The answer is both obvious and simple, *viz.*, that it is not a question of hydrostatics in a closed chamber, since we are dealing with a mass of moving fluid. It is a question of hydro-dynamics. This is the key to the mystery, or to what has very unnecessarily become a mystery. The difference in pressure between the fluid at its areas of secretion, and of excretion, premises a movement of the fluid mass. Anything which stands in the way of that movement, as the closure of the peri-lental straits would do, will exaggerate the difference of pressure between the fluid in the vitreous body and that in the chamber. Any step which will lower the pressure in the vitreous chamber, and thereby lessen ciliary congestion, will pave the way for a re-opening of the normal channels of communication between the two chambers. It may be urged that there is nothing new in this argument, and that no fresh facts have been brought forward. This is admitted. The point is, that sight has been lost of the fact that our problem is one of hydrodynamics and not one of hydrostatics. We are not dealing with a closed chamber, but with one through which fluid is continually passing. This cardinal fact modifies all our conceptions on the subject. To lose sight of it is to miss the crux of the whole question.

The lessons to be learnt from a case of ring synechia, with *iris bombé*, have often been pointed out, but they are so germane to the present discussion that their repetition may be pardoned. The bellying forward of the iris is clear evidence that the pressure behind it is greater than that in front. Probably the difference in pressure between the area of secretion and that of excretion, which we referred to above, is here slightly exaggerated by the damming back of the fluid at the pupil, though it must be very doubtful if a manometer experiment could show it even in this case. If now we perform an iridectomy, however small, we find that the bulging of the iris ceases, and the membrane lies flat. We have here an experiment, planned for us on a scale far more delicate than any we could devise, to show conclusively that the intra-ocular pressure is not uniform throughout the chambers of the eye. So, far from it being safe to assume that the pressure in the aqueous and vitreous chambers is the same, we see clearly from this clinical observation that the pressure is not the same throughout the extent of even one chamber alone.

The Source and Method of Production of the Intra-ocular Fluid.

The intra-ocular fluid is derived from the blood. Apart from its nutrient and dioptric functions, it plays an important rôle in maintaining the normal pressure of the eye, and thereby keeping the tunic of the globe in a suitable condition of distension. It is generally agreed that this fluid is poured out from the ciliary body, but there is considerable difference of opinion as to whether it is a filtration or a true secretion. Closely connected with this question is that of the exact part of the ciliary body which produces the fluid.

Experimental research has shown a close relationship between the amount of intra-ocular fluid secreted and the difference recorded at the same time between the systemic blood pressure and the intra-ocular pressure; and this has been taken to indicate that the process is to be regarded as one of filtration, and not one of secretion. It has further been shown that, inasmuch as the intra-ocular fluid is practically free of proteins, the pressure required for the purpose must be one of at least 30 mm. of Hg., *i.e.*, the difference between the intra-ocular capillary pressure and that of the intra-ocular fluid must be one of at least 30 mm. of Hg. The advocates of the filtration theory maintain that there is no difficulty in the way of supposing that such a difference of pressure can and does exist within the eye. To this supposition the secretionists demur, believing that the pressure in the intra-ocular capillaries is lower than has been assumed. Unfortunately there does not seem to be any known method of estimating the capillary pressure. A further objection raised is that the anatomical conditions demanded for such a filtration do not exist, and that pre-supposing that the fluid were expressed as suggested through the capillaries of the ciliary processes, it would find itself, not in the chambers of the eye, but in the connective tissue spaces of the ciliary body, the easiest method of escape from which would be *not* through the lining epithelium of the ciliary body, but towards the angle of the anterior chamber. The reply to this has been that it is not possible to argue a physiological problem on the basis of anatomical observations alone, and that such data require the support of experimental work before they can be accepted.

The important fact to bear in mind would seem to be that the production of the intra-ocular fluid varies directly with the height of the blood pressure in the vessels of the eye. From this it would appear that we must either look on it as a filtration under pressure, or else assume that the secretory cells are sensitive either to the variations in local blood pressure, or to the volume of tissue fluid transuded into the spaces of the ciliary processes.

Those in favour of the filtration theory would locate the seat of production of the intra-ocular fluid at the ciliary processes; whilst those who think there is a true secretion, believe that the *pars plana* of the ciliary body takes no small share in the work. They point to the existence of the glands described by Treacher Collins, and to the morbid exudation which can be traced from the neighbourhood of the *pars plana* into the vitreous under certain conditions, as showing that this part of the body is capable of active secretion. Moreover, the ciliary processes are covered by a well-marked columnar or cubical epithelium, the cells of which are as well-formed as are those of the salivary glands or of other secreting structures. They urge that there is therefore no *a priori* reason to dispute the possibility of the intra-ocular fluid being looked on as a true secretion. Others, however, take the view that the ciliary body does not resemble a true gland in its general anatomical features, and that the tubular depressions of the *pars plana* bear only a superficial resemblance to true tubular glands as these are met with elsewhere.

There would seem to be a tendency to arrive at a happy compromise, and whilst insisting that filtration under pressure plays an important *rôle*, to admit that the fluid thus poured out in the neighbourhood of the lining membrane of the ciliary body, may be actively passed through by the epithelial cells to the surface of the membrane. If this theory ultimately finds favour, the production of the intra-ocular fluid will have to be regarded as a combination of pressure filtration, and of secretion. In the present state of our knowledge, it would be most unwise to dogmatise, since the data available are insufficient. We must therefore be content to await the progress of further research, and we can do so with the greater equanimity, since the interest of the question is largely an academic one, as will be understood from the following considerations. If we look on the process as one of filtration, requiring a high capillary blood pressure, we must remember that work is done in this filtration; to get the fluid through requires that work should be done, and by the time the fluid has passed through it has lost some of the energy with which it started its journey; it has fallen in fact to the level of the intra-ocular pressure. On the other hand, if the fluid is a true secretion, that secretion is an active vital process: the cells actually do work, and there is therefore no loss of energy involved; for that matter the pressure of the fluid secreted might easily rise above that of the intra-ocular pressure. The assumption, on the part of the secretionists, that the initial pressure in the capillary vessels is low, is of course not inconsistent with their view that the normal tension of the eye may be maintained by the process of secretion, nor even that a tension far above the normal might be produced by the same agency.

(To be concluded.)

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—PHYSIOLOGY.

(1) **Kanngieser, F.**—Comparative studies of miosis due to light and to convergence, and of the action of atropine and eserine upon the iris and ciliary muscle, together with remarks concerning the form of the pupil. *Archives of Ophthalmology*, March, 1911.

(2) **Lempp, H.**—Researches on the resting position of the eyeball. (Untersuchungen über die Ruhelage des Bulbus.) *Zeitschrift für Augenheilkunde*, Juni, 1912.

(3) **Löwenstein, Arnold.**—On alterations of the form of the iris on aspiration of the vitreous. (Ueber Veränderungen der Irisform bei Glaskörperansaugung.) *Arch. f. vergleichende Ophth.*, Bd. III, Heft ii., S. 211, Juli, 1912.

(4) **Hamburger, C.**—Does the cornea play no part in the resorption of the aqueous? (Ist die Hornhaut an der Resorption des Kammerwassers unbeteiligt?) *Klin. Monatsbl. f. Augenheilkunde*, September, 1913.

(5) **Pollock, W. B. Inglis.** The persistence of the nerve plexus of the iris after excision of the ciliary ganglion and of the superior sympathetic ganglion. *Arch. f. vergleichende Ophth.*, Bd. IV, Heft i, S. 39, Januar, 1914.

(6) **Massy,**—Comparative researches upon the influence of massage upon the behaviour of Indian ink in the eye. (Vergleichende Untersuchungen ueber den Einfluss der Massage auf das Verhalten im Tusche im Auge.) *Zeitschrift für Augenheilkunde*, Februar-März, 1914.

(7) **Casolino, Leonardo.**—Modification of the intra-ocular pressure by means of drugs having vasomotor action. (Intorno al modo di comportarsi della pressione endoculare di fronte a farmaci modificatori della pressione arteriosa.) *Archivio di Ottalmologia*, Maggio 14.

(8) **Uribe y Troncoso.**—New researches on the lymphatic circulation of the living eye and of other organs, and the measurement thereof. (Nuevas investigaciones acerca de la circulacion linfatica en el ojo vivo y en otros organos y su medida.) *Anales de Oftalmologia*, August-September, 1914.

(1) By the examination of one hundred persons, **Kanngieser** determined that from the tenth to the thirtieth year miosis from light is greater than from convergence, while the reverse is true from the fortieth to the sixtieth year. The change comes in the thirties, at which time there is the least average difference between the miosis produced in the two ways.

The decrease in the size of the pupil on response to both light and convergence with advancing age is very clear. It is also shown that sex and the colour of the iris have apparently no influence on the size of the pupil.

By the examination of fifty persons to test the amount of difference between the pupillary diameters when converging to 15 cms. and to the utmost possible, it was shown that the contraction was fairly proportionate to the degree of convergence, but that the degree also depended on the age, for the difference increased with advancing age. Under 30 years, the variation was fairly constant. Sex had no influence.

The shape of the pupil was noted in two hundred persons. In only 5 did it differ from the usual circular form; in 4 the pupils were vertically oval, and in 1 transversely oval. Only 2 cases of anisocoria of physiological nature were found. Remains of the so-called pupillary membrane occurred in 4 persons, in only 1 in both eyes. Five per cent. of the cases showed traces of retinal pigment extending to the pupillary margin.

For atropine the following results were obtained:

(1) The duration of action of one drop of a 1 : 1000 solution of atropine is about 100 hours, that of one drop of a 1 : 2000 solution about 60 hours; (2) the maximum dilatation of the pupil is dependent on the dose and is attained from 50 to 60 minutes after the instillation, but is maintained only a very short time. The retrogression to normal is very gradual; (3) the paralysis of the ciliary muscle reaches its maximum from 4 to 6 hours after the instillation. During the rise and fall of the action of atropine, fluctuations are noted in which the near point may approach the normal and again the aid of convex glasses be needed for Jaeger 1. These are explained by the fact that every muscle with slight paresis makes convulsive efforts to produce the greatest possible contraction; (4) the far point is scarcely affected in the atropinised eye.

For eserin the following results were obtained:

(1) the effect produced by a 1 : 1000 solution of eserin lasts only about half as long as that produced by a solution of atropine of equal strength, about fifty hours; (2) the maximum effect is reached in from thirty to fifty minutes; (3) the near point is drawn nearer to perhaps half the normal, and this is not only due to contraction of the pupil, because, when using a diaphragm with only a minute opening before an eye without eserine, the near point was only drawn nearer about 25 per cent.; (4) the far point was not influenced in many cases by a drop of 1 : 1000 solution of eserin, except that the eye required a little more time to adjust itself from the near to the far point, but with stronger doses the far point was distinctly drawn nearer.

With both atropine and eserin, the eserin acted first, contracting the pupil, but then the atropine dilated it, although to a less extent than when acting alone. If the eserin was used in a 1 per cent. or 1.5 per cent. solution simultaneously with a 1 : 1000 solution of atropine, the atropine acted less strongly and for a shorter time. With the same strength solutions, but the eserin instilled half-an-hour after the atropine, the dilatation of the pupil was checked, but the effect on the accommodation was but little altered. The effect was similar when the eserin was instilled at the moment of greatest dilatation of the pupil, *i.e.*, an hour after instillation of atropine, and also when the solution of atropine was only 1 : 2000. A drop of atropine in a solution of 1 : 2000 instilled at the height of the effect produced by a 1 : 1000 solution of eserin, caused a very great dilatation of the pupil, but only a moderate effect upon the near point. ROSA FORD.

(2) This paper by **Lempp**, of Berlin, embodies the results of an examination of 425 individuals with the Maddox rod and tangent scale.

Of 103 emmetropes 30¼ per cent. had orthophoria, 39½ esophoria, and 30¼ exophoria. Of 193 hypermetropes 22⅔ had orthophoria, 46⅓ esophoria, and 31 exophoria. Of 129 myopes 23½ had orthophoria, 36⅓ esophoria, 40⅓ exophoria. These figures, the author says, only represent the minimum possible figures for heterophoria. The desire for fusion is so intense that probably a large number of cases of mild heterophorias appeared as orthophorias.

The errors are also tabulated according to age. Orthophoria is commonest in middle age. Esophoria is most frequently present among the young. It diminishes in the older individuals, whereas, *pari passu*, exophoria becomes more common in the aged. T. Harrison Butler.

(3) On aspirating somewhat brusquely the vitreous of a rabbit to the extent of over 0·4 cc.m., **Löwenstein,** of Prague, finds that the anterior chamber deepens, the pupil contracts, and the iris takes the *bombé* form. If the pupil be previously contracted, the iris becomes folded rather than driven forwards. These phenomena appear immediately and last some eight hours. The explanation seems to be that the sudden loss of tension in the vitreous causes the lens and pupillary part of the iris to sink back. At the same time the tension in the anterior, being higher than in the posterior, chamber, the pupil is pressed against the lens and the passage of fluid through it is hindered—there is in fact a seclusio pupillæ. This seems to be proved by the fact that the iris *bombé* is abolished if the iris be pricked, or if the pressure of the aqueous be diminished or that of the vitreous increased. It is not clear why heightened pressure in the anterior chamber should not drive back the periphery as well as the centre of the iris. That the phenomenon is mechanical, not vital, is shown by its occurrence in the dead eye. The seclusion of the pupil is slight and easily overcome by raising the pressure in the posterior chamber. The folding of the iris is probably due to the fact that normally the rabbit's iris projects somewhat forward, but after aspiration hangs vertically, and therefore has less room. The contraction of the pupil seems to be due to the partial collapse of the globe. The whole matter seems to be of little importance. George Coats.

(4) **Hamburger,** of Berlin, showed at the Heidelberg Congress some sections which he believed to prove that resorption of aqueous took place through Descemet's membrane, this part of the cornea having become stained by sulphindigodate of soda injected into the ear vein in the rabbit. Both his facts and his inference were disputed, but he maintains the accuracy of his statements. If a 2 per cent. solution is injected into the femoral vein staining is found in the membrane of Descemet, in the walls of the iris vessels, and to a less degree in the vessels of the ciliary body. If only a very small quantity (1.5 cc) of a 2 per cent. solution is injected into the ear vein of a small rabbit, and if the eye is enucleated a quarter of an hour later, only the posterior surface of the cornea is stained. This the author takes as unequivocal evidence of resorption of aqueous through the membrane of Descemet. A. J. Ballantyne.

(5) **Pollock,** of Glasgow, investigates the question whether or not the nerve plexuses of the iris are independent of the central nervous system. It has been asserted by Fletcher that in the case of the retractor penis of the hedgehog the peripheral plexus disappears after division of both the inhibitor and motor fibres, and that therefore no local trophic centres in the end apparatus exist. On the other hand an opposite conclusion is suggested by the facts that in the excised iris, according to Brown-Sequard, light causes the sphincter to contract, and that in the excised eyeball atropine dilates the pupil. The iris is very rich in nerve plexuses, although their demonstration

is somewhat difficult; four are said to exist—a motor plexus for the sphincter one for the dilatator, one for the supply of the vessels, and a plexus believed to be sensory. Anastomoses are frequent, but the existence of nerve cells has been held to be doubtful; they seem to have been demonstrated, however, by the methylene blue method.

In order to study the independence of the postganglionic plexuses it is necessary to cut off the whole nerve supply of the iris by excising the ciliary and superior cervical ganglia. It must then be proved, with suitable controls, that the medullated nerves have really disappeared, and this requires a reliable staining method. In this matter Pollock had some difficulty, gold chloride and the Cajal method giving occasionally very beautiful results, but not being sufficiently trustworthy. Intravital staining with methylene blue, according to Hosch's modification of the Dogiel method, was the procedure finally adopted.

The conclusion arrived at by the author is that the plexus does in fact persist after complete denervation of the iris. He finds that ganglion cells are present, and in one specimen he found a fibre terminating in a body resembling a special nerve ending. He does not agree with Münch and Schock, who have described a direct connection between the nerve fibres and the muscle cells. The plexus is presumably of the same nature as those of Auerbach and Meissner in the intestine. GEORGE COATS.

(6) **Massy,** of Basle, has carried out experiments to determine the effect of massage upon Indian ink which he injected into the vitreous and anterior chamber of rabbits. He finds that massage hastens the absorption of foreign substances in the globe, probably by increasing the circulation of fluids in the eye. Massage appears to propel the fluids from the vitreous towards the anterior chamber. He observed that during massage particles of Indian ink were driven from the vitreous into the aqueous more rapidly than in the control eyes. T. HARRISON BUTLER.

(7) In this paper **Casolino** gives the results of the intravenous injection of certain drugs, both hyper- and hypotensive, on the intra-ocular pressure. The tabulated forms, however, are a little disappointing, in that they do not give the time of the injection nor the time after which the alteration of pressure was noted; the sole guidance is that the pressure was taken "immediately after the injection" and occasionally "later." (*Subito dopo l'iniezione: ancora dopo l'iniezione.*) The conclusions are as follows:

Coline in dose 0·02 grms. produces lowering of the arterial and of the intra-ocular pressure. Half this dose is followed by a slight rise in the intra-ocular pressure followed later by a fall.

Nitrite of amyl in inhalation brings about a fall in the intra-ocular pressure much greater than the fall in the arterial.

Adrenalin raises both the arterial and the intra-ocular pressure; but whereas the former is a lasting rise, the latter is very evanescent.

Strophanthin produces a rise in the arterial and a fall in the intra-ocular pressure. HAROLD GRIMSDALE.

(8) **Troncoso** has added to his other researches on this subject, in this new paper; he has found it necessary to investigate the lymph flow on the living eye, because the other and older methods of estimating the lymph flow have been shown to be very inaccurate.

He has found it possible to use the eye of the living rabbit dislocating it from the orbit, and immersing it into a vessel containing oil; to do this involves the division of the conjunctiva, and of the tendons. Then from the anterior ciliary veins and from numerous tiny vessels around the cornea, there is a continuous flow of lymph; this can be collected and measured.

The escape of blood to some extent confuses the issue.

He finds the average excretion of lymph in the rabbit to be 35 cubic millimetres a minute. He discusses the statement of Weiss, that a similar flow of lymph may be observed in any part of the body, and concludes that this is untrue; from experiments he satisfies himself that the only structures which behave in the same way as the eye are the serous membranes. It is curious that the flow in the tunica vaginalis of the rabbit is almost exactly equal to that observed in the eye. HAROLD GRIMSDALE.

II.—METASTATIC OPHTHALMIA.

(1) **Selenkowsky, I. W.—Endogenous infection as the cause of eye diseases. (Die endogene Infektion als Ursache der Augenleiden.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(2) **Poulard.—Metastatic ophthalmia.** *Universal Medical Record*, March, 1915.

(1) **Selenkowsky,** of Petrograd, discusses the experimental researches of himself and others on this question. These researches, in general, show that infection by endogenous paths with bacteria which, when injected directly into the eye, cause a severe suppurative process, leads only to a chronic plastic inflammation. This fact is due to the reduction in virulence suffered by the organism in its passage through the blood and tissues, as well as to the small number of organisms reaching the eye as compared with the number gaining entrance in a direct inoculation experiment. Further, it has been found that in endogenous infection the organisms gain access to the ocular media through the blood-vessels, very exceptionally through lymphatics, and chiefly through the vessels of the ciliary body for the anterior, and through the vessels of choroid and retina for the posterior, part of the eye.

Factors which favour the arrest of bacteria in the eye and their passage to that destination are: 1. Stasis in the blood-vessels of the eye; 2. Trophic changes in the walls of the ocular blood-vessels; 3. Actual degenerative changes in the vessels; 4. Passage of blood through the walls of the vessels by rupture or by diapedesis; 5. The occurrence of infected emboli or thrombi.

Factors which protect the eye against infection and against the injurious action of organisms which have entered the tissues or fluids of the eye are: 1. The power of the normal outflow of aqueous to carry off bacteria through Schlemm's canal; 2. The inhibitory action of the aqueous itself on the growth of bacteria in the anterior chamber; 3. The impermeability to bacteria of the tissues separating the aqueous from the vitreous chamber, 4. The difficulty with which bacteria gain access to the vitreous from the blood stream, except in infections of great severity; 5. The prompt and energetic phagocytosis against bacteria which have gained entrance to the aqueous, vitreous, or other eye tissues. A. J. BALLANTYNE.

(2) As pointed out by **Poulard**, of Paris, almost all endogeneous affections of the eyeball are nothing else than metastatic localisations in the eye of a generalised infection transmitted to the organ of sight by way of the blood.

As a rule, a septic embolus gains entrance into the eyeball by the short posterior ciliary arteries, but in rarer cases the central artery of the retina may be the means. At the outset therefore metastatic ophthalmia is nothing else than a diffuse choroiditis, a metastatic inflammation of the choroid.

SYDNEY STEPHENSON.

III.—OPHTHALMIC INJURIES IN WARFARE.

(1) **Jessop, Walter H. H.**—Discussion on ophthalmic injuries in warfare. *Ophthalmological Society U.K.*, April 22nd, 1915.

(2) **Lister, W. E.**—Discussion on ophthalmic injuries in warfare. *Ibidem.*

(1) Among the more important subjects raised by **Jessop**, of London, is that of papillœdema as a complication of injuries of the skull sustained in warfare. The essential nature of such injuries, as inflicted with bullet or shrapnel, is generally a depressed fracture. There is seldom much swelling of the optic disc, and what is present is limited to the disc and a narrow zone around it. Hæmorrhages are usually absent. Sight is not affected, while the colour-sense and fields show no changes. Five or six days after decompression or equivalent operation, the swelling of the disc subsides, and all traces of papillœdema have disappeared in from fourteen to twenty-one days. In one case mentioned by Jessop, where papillœdema lasted for two-and-a-half months after a depressed wound at the back of the skull, the discs recovered their normal appearance, and sight was equal to 6/6 throughout. None of the fifteen cases seen by the author has gone on to atrophy. The author thinks that the condition is probably present in all cases of injury to the vault of the skull, provided increased pressure is present. Such figures as he has obtained place the proportion at from 52.4 per cent. to 75 per cent., but, inasmuch as the changes are often slight and transient, due allowance must be made for those factors. The appearances of the papillœdema suggest the influence of œdema, and not of inflammation.

Speaking on the subject of occipital injuries, Jessop details a couple of cases of injury and blindness, followed by permanent changes in the fields of vision, more or less symmetrical, in each eye. In this respect the cases now brought forward resemble those published after the South African war by Sir Anderson Critchett and J. H. Fisher respectively. Jessop would explain his own and similar cases on v. Monakow's last theory of diaschisis. "The injury," he says, "produces diaschisis or shock on the systems and groups of neurons anatomically or functionally correlated with the cortical neurons damaged or destroyed. In these occipital cases the 'initial' phase of the diaschisis is blindness due to the fact that the shock of the injury to the occipital area of the brain on the side of the lesion is transmitted by commissural fibres to the correlated occipital area on the other side. As in these cases each area presides over half the field of vision in each eye, the effect of shock on the areas on both sides is blindness. After a time, depending on the condition of the brain, the shock tends to pass off, and the 'regressive' phase is entered on. The correlated centre on the opposite side of the brain to the lesion recovers generally completely, and we are left with the 'residual' phase."

At the beginning of the war there were many cases of complete but temporary blindness in men exposed to the effect of severe explosions. The pupils were active to light, the condition was bilateral, and the ophthalmoscopic appearances were normal. The blindness rarely lasted for longer than a week. Deafness and dumbness were also noted. Blepharospasm was present in three men, and in one patient, a Belgian, the condition lasted for three weeks. The cases were due to shock, and in some instances to neurasthenia and even subconscious malingering. In several of the patients Jessop felt convinced, however, that some definite cerebral affection must have been present. Jessop suggests that in these cases of temporary blindness we have a condition, which may be " psychic " shock from violent emotion or commotio cerebri from mechanical causes, as " windage." The initial shock in these cases is loss of consciousness, which passing away, leaves at the regressive phase blindness, deafness, or even loss of speech, followed in most cases by complete recovery.

Finally, it is interesting to note that in this war Jessop has neither seen or heard of a single instance of sympathetic ophthalmitis.

SYDNEY STEPHENSON.

(2) **Lister**, of London, as consulting ophthalmic surgeon to the forces in France, has had abundant opportunities for studying at the front injuries to the eyes sustained in warfare. The result is a most practical communication.

Lister suggests an analogy between commotio retinæ, on the one hand, and concussion of the brain, on the other, and believes that the present war affords a great opportunity of investigating the exact nature of the white retinal areas in concussion cases. He comments upon the rarity of detachment of the retina in warfare, considering how often blows upon the eye cause that condition in civil life. Lister mentions a case due, he thinks, to concussion of the eye caused by the windage of a bullet, which passed through the root of the nose and grazed the lids, but did not touch the cornea. The result was an area of striate keratitis towards the outer side of the cornea, and opposite this area, the pupil refused for several days to dilate.

An eyeball penetrated by bullet or shrapnel is often completely eviscerated, and is ripped up from before backwards into numerous leaves. When removing these eyes, it is advisable to seize each petal of sclera with pressure forceps, and to dissect off the muscular attachments after the fragment has been drawn forward and rendered taut. Otherwise, some difficulty is apt to occur.

When orbital cellulitis or panophthalmitis is present, Lister has devised an operation whereby a frill of sclera is left around the nerve, so that the nerve sheath is not opened. Brief details follow.—The cornea, supposing it to be intact, is removed, and the contents of the eyeball are scraped out. The muscles are next divided, the sclera is cut in such as a way as to leave a frill of about 4 mm. or 5 mm. in radius around the uncut optic nerve.* The author summarises the advantages of this procedure as under.—There is no danger of septic meningitis ; there is no shock due to division of the nerve ; bleeding is less than in the common method ; free drainage is afforded for the cellulitis ; and, finally, healing is more rapid than if the whole sclera is left as after simple evisceration.

Respecting penetration of the eye by small foreign bodies, Lister regards

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Jessop suggests that the globe should be packed with gauze prior to undertaking the dissection. The material is removed before dividing the sclera in front of the optic nerve. The hint is likely to be useful.

such cases as unsatisfactory to deal with, inasmuch as many fail to give a visible shadow with X-rays, and he has yet to come across one which was of magnetic nature. Two factors render the success of an operation doubtful: first, the frequent presence of more foreign bodies than have been diagnosed; and, secondly, the friability of the foreign bodies, rendering them liable to break off when caught in the grasp of the forceps. Lister makes the important statement that even if an eye contains a foreign body, provided there is no entanglement of uvea or lens capsule, there is no risk of sympathetic disease, despite the teachings of tradition and the statements current in the text books. He might, perhaps, have added that another essential to immunity lies in the absence of any operation. Lister prefers to wait and see, or, as he puts it, wait until the eye does not see, before enucleating, always provided the congestion and irritation subside. Again, if there be any entanglement of the uvea that cannot be removed, the eye should be sacrificed.

To show what a variety of substances may lodge in the cornea, Lister mentions a case where he removed from a man's cornea, "two small pieces of metal, a hair, and a portion of his neighbour's skull." A Beer's knife is the most suitable instrument for removing a foreign body deeply embedded in the cornea.

A variety of phenomena may be produced by the shock of an exploding shell, as, for example, curious colour sensations, blepharospasm, night-blindness, and more or less complete loss of sight. In these functional conditions Lister has not yet come across the optic neuritis or retinal œdema diagnosed by other observers. He has himself seen neither external nor ophthalmoscopic signs of disease or injury. It must not be forgotten that sufferers from true functional defect may degenerate into actual malingerers.

Papillœdema, due to increased intra-cranial pressure, was found to occur in slightly over 50 per cent. of cases where a bullet had struck or penetrated the head. The condition may exist with grazing wounds where neither the bone nor the dura has been penetrated, and may subside without operation. Hæmorrhages or exudations are not commonly present. From this fact it follows that the presence of papillœdema does not point to the immediate necessity for operation. The ophthalmoscope should be used often in these cases. In a couple of cases where the papillœdema was asymmetrical, the greater swelling was on the same side as the more intense headache, and (as shown by operation) on the same side as a large clot of blood pressing on the cortex.

As to occipital injuries, Lister states that the facts are comparatively simple, although the explanation permits of much discussion.—(1) When the lesion occurs over the occipital cortex of one side only, the result is either hemianopsia or homonymous quadrantic defect on the opposite side; (2) when the bullet passes through both occipital lobes, there is at first complete blindness, but in several cases this had gradually cleared towards the centre, after an interval of some hours or days, giving rise to a central scotoma, with a full peripheral field. In other cases we may get hemianopsia with partial homonymous quadrantic defect on the opposite side, combined with a central scotoma, or a central scotoma with a marked tendency to hemianopsia.

SYDNEY STEPHENSON.

IV.—HETEROCHROMIA.

(1) Bistis, J.—Paralysis of the sympathetic in the ætiology of heterochromia. (La paralysie du sympathique dans l'étiologie de l'hétérochromie.) *Archives d'Ophtalmologie*, septembre, 1912.

(2) Williams, Carl.—Heterochromia iridum. *Ophthalmic Record*, July, 1913.

(1) In the cases of acquired heterochromia reported up to the present, **Bistis**, of Athens, draws attention to the association of the condition with paralysis of the sympathetic.

He considers that trophic disturbances, as evidenced by the presence of cyclitis, etc., must be held to be responsible for the change in colour in the acquired form, just as much as they are the cause in the congenital form, and that the origin of the trophic disturbances is to be found in disease of the cervical sympathetic. He suggests that heterochromia might well be added to the cardinal symptoms of Horner's syndrome, and says that the fact of it not being constant in all such cases is no argument against a sympathetic paralysis.

He reports a case bearing out his opinion, which is based, in addition, on a careful survey of those already recorded by the various writers on the subject. His case is that of a woman of 38, who had observed during the previous two years a change in the colour of the right eye, accompanied by diminution in vision, with pain around the globe, in addition to which hearing on the right side had become impaired. Nothing abnormal was noted in the urine. The right eye showed slight ptosis, appreciable enophthalmos, and some fine deposits on the posterior corneal surface, especially opposite the pupillary area. The iris was grey-blue and slightly atrophic. Under cocaine, the right pupil was distinctly smaller than the left; adrenalin had no effect. The lens showed radial opacities at the periphery and in the posterior cortical zone. The rest of the eye showed no change. Tension was a little diminished, and vision on correction=$\frac{1}{4}$. Right facial hemiatrophy was present, with pallor of the skin and absence of perspiration. BERNARD CRIDLAND.

(2) The case reported by **Williams**, of Philadelphia, was in a healthy youth, aged 19, whose irides were brown until he was 15 years of age, when that of the left eye changed to a blue-grey. The vision of the left eye, however, had always been defective. Three months before he consulted the writer, he had noticed a gradual change in the colour of the left pupil, which had by this time, become white. He had never experienced any pain or discomfort, and had not observed any redness of the eye. The left eye was now divergent, the pupil, a little larger than the right, did not react to light. The iris was blue in colour The lens was cataractous and white, with several pigment dots on its anterior surface, but none on Descemet's membrane. No sign of inflammation; tension normal; V.= no p.l.

The author discusses the pathology of the complaint, and quotes the views of Galezowski, Butler, and others. J. JAMESON EVANS.

V.—SYMPATHETIC OPHTHALMITIS.

(1) **Dehenne et Bailliart.—A propos three cases of sympathetic ophthalmia.** (A propos de trois cas d'ophtalmie sympathique.) *La Clinique Ophtalmologique*, 10 septembre, 1913.

(2) **Gifford, H.—A theoretical consideration of some phases of sympathetic ophthalmia.** *Ophthalmic Record*, February, 1914.

(1) **Dehenne** and **Bailliart** once more go over the old familiar points regarding the crucial problems of enucleation for sympathetic opthalmia—actual, threatened, or probable. Speaking to the question of enucleation after the actual outbreak of sympathetic ophthalmia, they take up a conservative position. If the injured eye is lost, enucleation. If it still has some sight—the authors do not seem to commit themselves as to how much sight—all the usual local and general treatment is employed, but enucleation is held over as a last resort. On the one hand, the injured organ may turn out the better in the end ; on the other, there has been a considerable number of cases in which sympathetic ophthalmia has become cured without enucleation having been done. Finally, in the three cases which they specially report, even after enucleation, and after the sympathetic disease was apparently cured, it reappeared after a lapse of three months, two months, and one month respectively. These relapses show that we have not done all that is necessary when we have enucleated the offending eye. Local and general treatment should be continued for several months longer.

ERNEST THOMSON.

(2) **Gifford**, of Omaha, discusses the various theories that have been advanced to explain the nature and mode of propagation of sympathetic ophthalmia. Biochemical theories are now much in vogue. Brown Pusey seems to have been the first to advance such a theory, *viz.*, "that when a damaged eye degenerates in the orbit, the cells of the eye (probably the lining cells of the ciliary processes and iris) can give rise to a specific cytotoxin, which, circulating in the blood, picks out the cells of the fellow eye, and may cause changes which we now designate as sympathetic ophthalmia," Golowin's "cyclotonic" theory was pronounced about a year later, still later we get Elschnig's, which holds that the disease is an anaphylactic phenomenon. None of these, in Gifford's opinion, offer any advantages over the microbic theory, and they have many defects—the most important being the want of explanation of the almost exclusive occurrence of sympathetic ophthalmia after penetrating wounds, and of the non-occurrence of the disease with the numerous non-penetrating injuries in diseases accompanied with extensive disorganization of the uveal pigment.

The incubation period and the similarity of the anatomical picture in the two eyes form the strongest argument against anything but a microbic origin of the disease. "The fully developed infectious granuloma of sympathetic disease can hardly be a product of anything except microbic action."

Other facts, such as the well-known difficulty of producing auto-anaphylaxis, seem inconsistent with Elschnig's theory.

As to the existence of the auto-intoxication or constitutional anomaly which Elschnig postulates, it is certainly not always evident, as it is not unusual to find healthy children and robust young men becoming affected. On no ground can the writer find any justification for Elschnig's view that the enucleation of the exciting eye can be of no use after the sympathetic ophthalmia has once broken out. He believes that "the first eye should be enucleated whenever there is no reasonable prospect of its obtaining useful vision," as its retention might injure the chance of recovery in the second, even if the disease be anaphylactic, by furnishing fresh accessions of antigen to the circulation.

The beneficial influence of atoxyl, salvarsan, mercury, urotropin, and possibly of the salicylates also, point to a microbic rather than an anaphylactic origin.

The author joins in the chorus of objection to the incorrect usage of the words "sympathy" and "sympathizing" by Continental writers.

J. Jameson Evans.

VI.—BI-ASTIGMATISM.

(1) Marquez, Prof.—Reply to Stock's criticism of my work on "Bi-astigmatism." (Erwiderung auf die Kritik von Stock betreffend meine Arbeit über "Bi-astigmatismus.") *Klin. Monatsbl. f. Augenheilkunde*, Dezember, 1913.

(2) Marquez.—Regarding the diagnosis of bi-astigmatism and its treatment by means of bicylindrical glasses with oblique axes. (A propos du diagnostic du bi-astigmatisme et de son traitement par les verres bicylindriques à axes obliques.) *La Clinique Ophtalmologique*, 10 avril, 1914.

(1) **Marquez**, of Madrid, in reply to Stock, maintains that in spite of theoretical considerations, it is often possible in practice to get a more complete and comfortable correction of a refraction error by means of bicylinders than by a sphero-cylinder. One point is that bicylinders often supply a correction which could not be made up in a sphero-cylindrical combination from the trial case and which could not readily be supplied to the optician. For example, a certain case gave best visual results with a combination of — 2 D. cyl. axis 10° and + 0·75 D. cyl. axis 165°. Translated into a sphero-cylindrical combination this would be + 0·1865 D. sph. ○ — 1·6228 D. cyl. axis 20°.

A. J. Ballantyne.

(2) The interesting article by **Marquez**, of Madrid, is not suitable for abstraction.

VII.—DEFENSIVE FERMENTS IN DISEASES OF THE EYE.

(1) Hegner, C. A.—Defensive ferments in eye diseases. (Les ferments de défense dans les maladies des yeux.) *Ann. d'Oculistique*, août, 1914.

(2) Frenkel, H. and Nicolas, E.—Abderhalden's reaction in ocular pathology. (La réaction d'Abderhalden en pathologie oculaire.) *Archives d'Ophtalmologie*, janvier-février, 1915.

(1) Under normal conditions organic materials introduced into the body are so altered by the intestine and its auxiliary organs that they become acceptable to the blood. Under abnormal conditions materials which are foreign to the blood may pass into the organism. This occurs chiefly when

the intestine and liver act badly, when the substances are introduced without passing through the intestine, or when any of the cells of the body pass into the circulation products which retain specific properties. The blood has a certain power of altering these foreign substances by the formation of specific ferments which break them up, so that they become homologous to it. In the present state of our chemical knowledge, we are unable to detect directly in the blood substances which are foreign to it, but we are able to infer their presence by establishing the presence of the specific ferments to which they give rise. This may be done by the optical method or the method of dialysis.

Hegner, of Jena, has applied the method of dialysis to the study of affections of the uveal tract, and, in particular, sympathetic ophthalmia. His method of procedure is as follows.—The uvea is carefully removed from a sufficient number of pigs' eyes and boiled several times in distilled water until testing with ninhydrine shows that there is no trace of albuminoid substance left in it. From ½ to 1 gramme of this tissue is then placed with 1 to 1.5 c.cm. of blood serum from the patient in a dialysis tube, *i.e.*, an animal membrane absolutely impermeable to albumin but permeable to the products of the disassimilation of albumin. This is placed in a vessel full of distilled water and left in an incubator at incubator temperature for 16 hours along with control tubes containing serum without uveal tissue and uveal tissue in distilled water. After the incubation, the water around the dialysis tube is tested with ninhydrine for albuminoid substances which are not present unless the serum contains ferments which are specific for uveal tissue. He has obtained results which he considers thoroughly trustworthy in 40 cases, and tabulates them as follows:—

	Number of Cases.	Reaction	
		+	
1. Sympathetic ophthalmia—			
(*a*) Recent	3	3	—
(*b*) Cured	1	—	1
2. Traumatic iridocyclites	16	16	—
3. Perforating wounds	12	4	8
4. Non-traumatic uveal disease ...	5		5
5. Normal cases	3		3
	40		

The author concludes: (1) that when perforating wounds of the eye are followed by inflammation of sufficiently long duration, and especially in the early stages of sympathetic ophthalmia, ferments are found in the blood which are specific for uveal tissue; (2) that perforating wounds which do not cause inflammation may, but usually do not, produce specific ferments in the blood; (3) that non-traumatic uveal inflammations do not produce specific ferments in the blood. Further observations showed that the formation of the ferments reaches its maximum while the inflammation is most acute, and that they disappear when the eyeball is removed or the inflammation subsides.

With a view to investigating Elschnig's theory, that the pigment cells play a large part in the causation of sympathetic ophthalmia, experiments were made with pigment isolated from uveal tissue and uveal tissue freed as far as possible from pigment. In both cases positive results were obtained.

The author concludes by pointing out that there are many problems arising out of his results which require further investigation, such as the question of whether the development of the specific ferments is due to the presence in the blood of uveal cells or cellular elements, and whether there is a relation of cause and effect between the changes in the blood and sympathetic ophthalmia.

He is carrying out similar experiments in corneal diseases.

R. J. COULTER.

(2) The conclusions reached by **Frenkel** and **Nicolas**, of Toulouse, are as follows:

(1) None of the eye patients whom we have examined has presented proteolytic ferments in the serum, with the appearance of dialysible products.

(2) None of the patients affected with early cataract or with ripe cataract or of those whose lenses were being resorbed after an injury presented in the serum ferments specific for the crystalline.

(3) None of the eye patients we have examined (irido-cyclitis, interstitial keratitis, hypopyon-ulcer) has presented in the serum ferments specific either for the uveal tract or for the crystalline.

SYDNEY STEPHENSON.

VIII.—POST-OPERATIVE COMPLICATIONS OF CATARACT.

(1) **Opin.—Corneal fistula due to capsular incarceration. (Fistule cornéenne par enclavement capsulaire.)** *Ann. d'Oculistique*, juin, 1913.

(2) **Schieck.—Upon endogenous infection after cataract extraction. (Ueber endogene Infection nach Staaroperation.)** *Zeitschrift für Augenheilkunde*, Dezember, 1913.

(1) **Opin**, of Toulon, records the pathological appearances in an eye in which the anterior chamber was not re-formed until ten days after the extraction of a cataract with iridectomy. The ultimate result of the operation was good, the patient having satisfactory vision until her death three years later. Microscopic specimens showed that there was failure of union of part of the edges of the wound causing a fistulous passage, due to the presence between them of a fold of anterior lens capsule between the entire thickness of the lips of the wound. The passage was clothed with epithelium which insinuated itself as a wedge between the lower lip of the cornea and the capsular fold, so that in the centre, the anterior chamber was only protected by the capsule covered with a layer of unstratified epithelium. The aqueous humour filtered between the capsular fold and the superior lip of the incision, through a very fine opening (*pertuis*) and spread into the subconjunctival tissue, which was very œdematous, so that the connective tissue fibrils showed up with the greatest clearness. Laterally, union of the wound was also absent, the edges being separated by three folds of capsule; but the conjunctiva passed like a bridge over the corneal section, while the epithelium lining the wound had the appearance of a tube, in the lumen of which desquamated epithelial cells were present. Still more laterally there was union of the superficial part of the wound, the deeper being still separated by capsule. The base of the iris was adherent to the posterior surface of the cornea, but not to the capsule.

The author remarks on the power of the lens capsule to resist absorption, and suggests that the cysts which have been described as occurring in cases of late iridocyclitis after cataract extraction, may have been analogous to the tubular prolongations of epithelium in his case. He considers that incarceration of the capsule may cause secondary glaucoma by mechanically pushing the base of the iris against the back of the cornea, or by providing a passage through which the conjunctiva can spread into the anterior chamber. The fact that the wound in this case was only covered by a simple row of epithelium, shows how liable such eyes must be to late infection as a result of even slight injuries. R. J. COULTER.

(2) **Schieck**, of Königsberg, contributes a short paper to the *Zeitschrift* upon the important subject of endogenous infection following cataract extraction. All ophthalmic surgeons must have experience of disappointing cases of extraction which promised to be successful, but eventually, perhaps even some months after the operation, developed a more or less destructive iridocyclitis. Are these cases due to endogenous infection, or to the lighting up of an infection sustained at the original surgical procedure? Probably both possibilities must be regarded as responsible. Schieck, after discussing the somewhat scanty literature of the subject, cites a case of his own in which at the end of a fortnight the visual acuity was 5/8 and everything seemed satisfactory; but upon the same day an iridocyclitis started, and an hypopyon developed. The chief focus of inflammation seemed to lie in the lower half of the iris, and not in the region of the section. Ultimately, with the use of Deutschmann's serum, the case recovered with an acuity of 5/15. Schieck decided to defer the necessary needling. T. HARRISON BUTLER.

XI—DETACHMENT OF THE RETINA.

(1) **Paton, Leslie.—Discussion on detachment of the retina.** (Opening Paper.) *Annual Meeting of the Ophthalmological Society, United Kingdom*, April, 1915.

(2) **Mayou, M. S.—Discussion on detachment of the retina.** (Opening Paper.) *Annual Meeting of the Ophthalmological Society, United Kingdom*, April, 1915.

(3) **Ramsay, A. Maitland.—Discussion on detachment of the retina.** (Opening paper.) *Annual Meeting of the Ophthalmological Society, United Kingdom*, April, 1915.

(1) **Paton**, of London, after disclaiming any intention of covering the whole subject, first considers symptomatic detachment, such as occurs in tumour, in perforating wound of the sclera, in severe choroiditis or general uveitis, in subretinal hæmorrhage and in recurrent vitreous hæmorrhage, and in cases where there are cicatrices in the retina itself. Traumatic detachment is another example of the symptomatic type, and in itself is a very large subject. Paton illustrates these various types of detachment by interesting case histories, and concludes that symptomatic detachment may arise either from (1) a push from behind, (2) a pull from inside, (3) a contraction in the retina itself, (4) a combination of any or all of these causes. He next considers so-called "simple" detachment and reviews the hypotheses of Raehlmann and of Leber and Nordenson.

"Symptomatic cases excluded," he goes on to say, "detachment does not occur so long as the vitreous humour retains its normal consistency and occupies its relative normal space in the eyeball." There are two classes of case in which a vitreous does not adequately fill its space, (1) where there is shrinking and degeneration of the vitreous, and (2) where there is increase of the space to be filled without corresponding increase of the vitreous. Cases are described of detachment in myopes in which the determining factor seemed fairly definite. An interesting case is one which apparently depended on the rupture of the membrane of Bruch. Paton discusses the influence of diminution of the secretory function of the ciliary body in causing degeneration of the vitreous, hyperæmia of the blood vessels, and consequently serous transudation into the subretinal space and detachment. He relates a good case in support of the possibility of what Galezowski called "sympathetic detachment." In this case there was nothing whatever to account for the detachment in the second eye, except an old-standing detachment in the other eye. The treatment which Paton seems to favour is post-equatorial galvano-puncture, which has given him a number of good results.

The final paragraphs of this paper may be transcribed :—"I hope I have made sufficiently clear my own belief that detachment of the retina may be the end result of many different processes, and that in the present state of our knowledge there is no hypothesis which can have a general application. Nor are we in a position to prognosticate which cases may have a favourable ending, if we do decide to intervene actively in treatment. To talk of reposition of the retina without restoration of vision as a cure is nonsense. The displacement of the retina is certainly the result of the disease, but it is not the whole disease, nor is its reposition the whole cure. The retina is primarily a vesicle, and even in its full development much of the vesicle condition still persists. The outer wall of this vesicle forms part of the membrane of Bruch, and so is brought into fairly firm connection with the subjacent choroid, while the inner wall, over the greater part of its extent, is only held loosely in apposition with the outer wall by the presence of the vitreous in the posterior chamber. A potential space is present, and it requires no great disturbance of these relations to convert it into an actual space. Indeed, when we consider the anatomical conditions and the frequency of fluid vitreous, we may think ourselves fortunate that detachment is not a great deal more common than it seems to to be."

ERNEST THOMSON.

(2) The opening paper by **Mayou**, of London, on the subject of retinal detachment deals almost entirely with the pathological side of the subject. It is a most suggestive article, but, like most other articles dealing with pathological subjects, exceedingly difficult to place before the reader in the form of a synopsis. The omission of almost any one point spoils the understanding of the whole. The reviewer, therefore, does not propose to make any such attempt at synopsis. It will suffice to say that Mayou holds to the view that while probably it is impossible to say that any one theory will account for all cases of detachment, since the condition is a sign rather than a disease, nevertheless the cause is exudative in origin. Of the theories which have been advanced to explain detachment, namely, that of v. Graefe, known as the exudative theory, that of Leber which supposes that the retina is pulled off by the contraction of vitreous bands, and that of Raehlmann, that the condition is produced by the diffusion of fluid from the vitreous into the inter-retinal space, the first is the one which Mayou strongly supports. His arguments the reviewer will leave to be read in the original, as it is only through the original that they can be appreciated.

The author deals specially also in a final paragraph with congenital detachment, and brings this into line as lending strong support to the theory that the detachment of the retina is primarily due to the effusion of fluid into the inter-retinal space. ERNEST THOMSON.

(3) **Ramsay**, of Glasgow, after giving a short general review of the subject of retinal detachment and its treatment, deals more particularly with his personal experience of the management of the condition Operations for the relief of detachment may be divided into groups according as their primary aim is to evacuate the subretinal fluid, to open up a communication between subretinal space and vitreous humour, to excite adhesive inflammation between retina and choroid, to increase the volume of the vitreous, to diminish the size of the eyeball, or to increase the intra-ocular tension. Ramsay points out that none of these procedures makes any attempt to reach the source of the disease, while many of them aim at establishing a condition of matters that is quite abnormal. He admits that after having tried many different operative methods he cannot recall a case where operation alone did any permanent good. At the same time he considers that the view of constant incurability held by Leber and by Vail is too pessimistic. Apart from spontaneous cures of the detachment "every clinician is familiar with the fact that a patient's vision may improve decidedly even although a considerable separation of the retina exists." Improvement of this kind may be due to increased transparency of the media, or to the settling down of a detachment to a peripheral part of the field. Though such cases are not cured, "from the patient's standpoint an improvement in sight is much more to be desired than an anatomical replacement of a retina whose function has become seriously impaired."

Ramsay holds that absolute rest in bed, not necessarily in the same bed all day, for from four to six weeks, is the most important partof the treatment. During this time every attention must be paid to make the patient as comfortable as possible, and everything must be done to ensure his good health, while all possible causes of straining must be avoided. "The ophthalmolgist can never dissociate himself from the general treatment of the patient."

In the second place, the author relies on a pressure bandage and atropine, unless indeed the pressure does not agree with the particular eye in question. The third place of honour is occupied by subconjunctival injections. If the site and the character of the detachment appear favourable the subretinal fluid is first evacuated by scleral puncture. At the same sitting a subconjunctival injection is given. This consists of five to twenty drops of a solution containing 1 per cent. dionine and 8 per cent. chloride of sodium (chemically pure) in 1 in 2000 bicyanide of mercury. Pain may be mitigated by the addition of a few drops of 1 per cent. acoine or 2 per cent. alypin solution to the injection fluid immediately before use. The injection fluid should be heated and a fomentation applied to the eye immediately after the operation. In about a week the chemosis has disappeared and the eye is ready for another injection. The average number given by Ramsay is from four to six. Where little improvement appears after a fortnight, diaphoresis by means of pilocarpine (with strychnine if necessary) may be employed. Wherever possible the patient should not return to work as soon as he is allowed up, but ought to have a change of air. In travelling he must endeavour to avoid jarring of any kind as much as possible.

The next point dealt with is is the association between detachment of the retina and myopia, and the necessity of prophylaxis by the care of the eyes of young myopes.

Lastly, Ramsay remarks that cases in which cataract forms in an eye which has suffered from detachment and in which the fellow eye is useless, are not so hopeless as one would imagine, since the retina sometimes becomes reattached after the lens loses its transparency. The lens may be extracted, though there is great risk of irido-cyclitis and ultimate loss of the restored sight. In these cases Ramsay performs simple extraction under a conjunctival bridge. A bibliography of over fifty names is appended to the paper.

ERNEST THOMSON.

X.—SARCOMATA.

(1) **Verhoeff, F. H.—An unusual case of epibulbar sarcoma.** *Archives of Ophthalmology*, March, 1911.

(2) **Charlet, H.—Optic atrophy and orbital sarcoma. (Atrophie optique et sarcome orbitaire.)** *Revue Générale d'Ophtalmologie*, 31 janvier, 1912.

(3) **Koller, Carl.—Two cases of epibulbar sarcoma.** *Archives of Ophthalmology*, July, 1912.

(4) **Maxson, S. C.—Sarcoma of the eye.** *Trans. Amer. Ophth. Society*, Vol. XIII, Part i, 1912, p. 192.

(5) **Pooley, G. H.—Case of giant cell sarcoma of the upper lid.** *Proceedings of the Royal Society of Medicine*, June, 1913.

(6) **King, G. Oram.—Choroidal sarcoma.** *Ophthalmology*, July, 1914.

(7) **Wells, D. W.—Melanosarcoma of the choroid.** *Ophthalmology*, July, 1914.

(8) **Greeves, R. Affleck, and Holmes, Gordon.—Flat sarcoma of the choroid with multiple metastases.** *Transactions Ophthalmological Society U. K.*, 1914.

(1) The patient whose case is reported by **Verhoeff**, of Boston, Mass., was a man of 47 years. The first sign of the tumour occurred ten years before, as a small red spot on "the white" of the right eye on the outer side. This had grown until there was, at the time of observation, a large, soft, nodular tumour about the size of a base-ball, protruding from between the lids. The tumour was removed, as well as the preauricular, cervical, and submaxillary glands, which were affected. There was no recurrence in the orbit, but three months later, recurrence took place in the glands, and the man died nearly a year after the operation. The eyeball was found to be imbedded in the tumour, and completely outside the orbit; there was no invasion by the tumour either of the eyeball or of the orbit. It proved to be a melanotic, spindle-celled sarcoma, originating, so the author thinks, from chromatophores at the corneal limbus.

ROSA FORD.

(2) The case reported by **Charlet**, of Montpellier, is of special interest to ophthalmologists, mainly because it points a moral.—The patient was a female, aged 19 years, who, at the end of 1910, presented merely signs of right optic atrophy, associated with slight indications of Bright's disease. The diagnosis was optic atrophy, possibly albuminuric in origin. In January, of 1911, the vision was completely abolished. Nothing fresh was noted until April of the same year, when the patient observed a slight prominence of the

right eye. The diagnosis was then made of orbital tumour, probably sarcoma. She was admitted to hospital, and examined rhinoscopically. *Definite diagnosis* :—tumour of the ethmoid cells, very probably sarcomatous. Operation offered, but refused. The patient was eventually operated on, when the tumour had reached large dimensions and had extended to the base of the skull. She died of shock a few hours after the intervention. The tumour was found to be a small round-celled sarcoma.

In discussing the case, the writer draws attention to the long period at the beginning during which the symptoms were purely ocular, and in no way pointed to retro-ocular tumour. Although the optic atrophy was primary, unilateral, and not accompanied by any retinal lesion, it was thought there were sufficient grounds for believing it to be albuminuric. In view of this case, the author impresses on us the necessity of thinking of retro-ocular tumour in optic atrophy of doubtful origin. In view of the destructive character of these tumours, and of their tendency to be propagated towards the base of the cranium, the prognosis is very grave, and the earliest possible operation gives the maximum chance of success. ERNEST THOMSON.

(3) In one of the cases reported by **Koller,** of New York, in a man of 38 years, removal of an epibulbar sarcoma was followed by recurrences, local metastases, and contact tumours, yet, after the removal of the last of these, there has been no recurrence for nearly eight years. The second case, a female of 17 years, had a very small tumour which was removed ; recurrence followed 2½ months later. This was destroyed with the cautery, and no recurrence has taken place for about six years. Koller lays stress on the need for thorough cauterisation of the base after removal of these tumours, and for this he uses the actual cautery. He agrees with Fuchs in thinking that enucleation should only be practised when the tumour is so large that the greater part of the conjunctiva would have to be removed with it. The diagnosis was verified in both Koller's cases by a pathological examination.
ROSA FORD.

(4) One of the three cases of sarcoma reported by **Maxson,** of Utica, N.Y., is of extraordinary interest.—A newly-born baby presented sixty small growths upon its body, as well as complete exophthalmos of one eye. Under the impression that an intra-orbital birth hæmorrhage might be responsible for the luxation, the author pushed the eye-ball back, and retained it in place by suturing the eyelids. But the globe, after a few days, again made its way outside the orbit, and finally it sloughed. The intra-orbital growth, which was present, protruded between the lids. The tumours on the body, which, at birth had ranged from the size of a pea-nut to that of a chestnut, became larger. Jaundice developed. The baby lived nearly three weeks. The diagnosis was "sarcoma of the orbit in utero", but it is a pity that the author vouchsafes no information whatever with regard to the histological characters of the growths. SYDNEY STEPHENSON.

(5) **Pooley,** of Sheffield, records the case of a woman, aged 65 years, who presented an oval pedunculated swelling on the upper lid, mobile on the deeper structures, and not firmly fixed to the skin over it. It extended up on to the forehead, and backwards into the orbit. It was elastic to touch, and pseudo-fluctuant. At operation it was found to be encapsulated, and was easily removed. Diseased skin was also taken away.

The tumour was examined by Professor Beattie, and found to be a very definite myeloid sarcoma. A little more than a year later there was a recurrence in the orbit, which was then exenterated. In another year, namely, in November, 1911, the growth recurred in the scar on the forehead. This was removed. and there had been no further recurrence. Pooley has seen two other cases, one Grimsdale's, the other Poulet Wells'. All these three cases have been in women of later middle life, have commenced in the centre of the upper lid, and have been definitely encapsuled.

ERNEST THOMSON.

(6) **King**, of Philadelphia, records a case in which there was a small pigmented choroidal sarcoma, situated near the macular region. The ocular tension was normal. The eye was enucleated, and the growth was found to be entirely intra-ocular. When reported, more than a year later, the patient was still well and without either local recurrence or general metastasis.

A. J. BALLANTYNE.

(7) The case discussed by **Wells,** of Boston, Mass., may be usefully considered along with that of King, published in the same journal. A melanotic sarcoma of the choroid in the first stage was diagnosed, and the eye was enucleated. No orbital recurrence occurred, and the patient remained well until eighteen months later. She then began to suffer from abdominal symptoms, and twenty months after the enucleation, died with very rapidly growing sarcoma of the liver and neighbouring parts.

A. J. BALLANTYNE.

(8) This minutely and scientifically described case, by **Greeves** and **Holmes,** of London, with its wealth of clinical and pathological detail and considerable bibliography, does not lend itself to useful abstraction. The best short description that could be given is in the authors' opening paragraphs.

"The case we are about to describe is of considerable interest from both the ophthalmological and the neurological points of view, as the tumour which originated in the eye belonged to the relatively rare class of flat pigmented sarcoma of the choroid, and despite its long duration produced no observable disturbance of vision, and was not detected, although careful and repeated ophthalmoscopic examinations were made. Further, it spread intracranialwards and produced metastases throughout the whole of the central nervous system, and there gave rise to a series of interesting clinical symptoms and an extraordinary pathological picture." How extraordinary is the picture we must leave to be read in the original. ERNEST THOMSON.

XI.—FOREIGN BODIES IN THE EYE.

(1) **Genet.—An unsuspected foreign body in the vitreous. Magnet extraction through a posterior sclerectomy. (Corps étranger du vitré insoupçonné. Extraction à l'aimant par sclérectomie postérieure.)** *Ann. d'Oculistique*, fevrier, 1914.

(2) **Baudry, S.—The diagnosis and prognosis of foreign bodies in the posterior segment of the eye. (Du diagnostic et du pronostic des corps étrangers du segment postérieur de l'œil.)** *L'Ophtalmologie Provinciale*, juin, 1914.

(3) **Eason, H. L.—Piece of steel in the vitreous.** *Proceedings Royal Society of Medicine, Section of Ophthalmology*, Vol. VII, July, 1914.

(1) **Genet,** of Lyons, records the case of a man, aged 50 years, who, while striking a nail with a hammer in the process of slaughtering an animal, felt a slight shock in his right eye followed by a sensation of light, and the appear-

ance of two black balls moving about in his field of vision. The eye got red at once, and in spite of treatment with atropine, it became painful, and its vision failed. When first seen by the author eighteen days after the accident, the patient had severe irido-cyclitis. The cornea appeared normal, but upon minute examination with a binocular *loupe*, an apparently insignificant leucoma was found. There was no perforation of the iris, and no foreign body could be found ophthalmoscopically, but the examination was difficult, owing to haziness of the media. A radiograph showed a foreign body which was located as being situated in the upper part of the eye far back. Owing to the inflammation, it was considered inadvisable to attempt to remove the foreign body through the anterior chamber, so a large incision was made through the upper bulbar conjunctiva and episcleral tissue, exposing the insertion of the superior rectus. A careful incision was made with a bistoury through the sclerotic behind the ciliary region between the superior and external recti, through which the lower blade of a punch forceps was introduced, and by a series of snips a hole was made in the sclerotic of such a size that it was judged the fragment could come through it. This was done without perforating the choroid. The point of a modified Volkmann's magnet was then applied to the hole, and after several unsuccessful attempts, a fragment of metal was removed, weighing 0·0046 grammes, without loss of vitreous. The conjunctiva was then replaced and sutured. The patient made an uninterrupted recovery with V.=1/3.

After making the scleral window, ten unsuccessful attempts were made to remove the fragment with a long point on the magnet. A short point was then substituted, and it was only at the fourth attempt that the foreign body came away suddenly. With a view to explaining why the earlier attempts did not succeed, the author made a series of experiments, which showed that a non-magnetised needle attracted to the magnet from a distance of 11 cm. was subsequently attracted from a distance of 43 cm. He therefore concludes that the ultimate success was due to the fragment having become magnetic, and that the sensitisation of the foreign body should be regarded as a step in the operation. R. J. COULTER.

(2) **Baudry,** of Lille, reports two cases in support of his claim that penetrating injuries to the posterior part of the globe should be carefully examined.

The first was a man injured in the left eye by a chipping of steel from his hammer. There was an insignificant conjunctival wound. A stubborn conjunctivitis prevented return to his work for several weeks. Three months afterwards, he passed the Army test successfully with both eyes. Six weeks later, or six months after the accident, the patient complained that the left eye was defective. On examination, there was choroido-retinitis with vitreous opacities. The electro-magnet gave a negative result. Examination by the X-rays, however, showed a piece of steel in the eye. In order to prevent sympathetic disease, the eye was enucleated. The lens was opaque and the retina detached, and a piece of steel was discovered in the outer and upper part of the eyeball.

The second case was that of a child of nine years, injured in the upper part of the face by small shot. On examination, the upper lids were swollen and ecchymosed, and the upper part of the conjunctival sacs was infiltrated with blood. A small contused wound was apparent in the lower *cul-de-sac* on the right side. This was evidence of a penetrating foreign body. The tension and fundus were, however, normal, and vision was good, and remained so for some time. After several weeks, the visual acuity showed signs of diminution and a detachment was noticed in the infero-external part of the right retina. The eye was excised. There was no foreign body in the eye, but there were evidences that a shot had traversed that part of the globe, entering about 7 mm. from the cornea and leaving 6 mm. from the disc. The pellet was presumably embedded in the soft structures or lying against the wall of the orbit.

Baudry mentions several aids to diagnosis.—The tension should be carefully taken; the surface of the iris should be examined with the binocular *loupe*: occasionally a small iridodialysis will be discovered. In old injuries (iron or steel) siderosis will be evident, and other signs should be looked for, such as hyphæma, hæmorrhage in the vitreous or in the coats of the eye, diminution of the visual acuity, contraction of the fields of vision, etc. If the media are transparent, an ophthalmoscopic examination is important, for in this way the foreign body may be located; a corresponding scotoma will be found in the field of vision. More often than not, however, vitreous hæmorrhage, opacities in lens and aqueous, and pupillary and other exudates obscure the fundus, and we have to rely on the radiogram. The X-ray tube should be placed laterally, so that the rays fall tangentially to the forehead on the affected side. The fixity or immobility of the shadow on the screen, with the gaze in different directions, indicates the position of the foreign body in the orbit or in the eyeball. If the shadow moves in the same direction as the eye, the foreign body is in the anterior segment, and *vice versa*; if immobile, it corresponds in position to the centre of rotation. A negative result is not to be depended on. Pictures should be taken with the eye in four different positions, and developed according to their distinctness. Localisation is not difficult, although cases have been met with where it was difficult to say whether the foreign body was in or outside the globe. The sideroscope is useful where the penetrating body is magnetic. The electro-magnet brought near to the eye will cause pain by displacing the foreign body and bringing it towards the sclerotic; in the case of an encysted object there will be no subjective symptoms.

Prognosis, in general, is bad. The tolerance of the eye for a foreign body depends on its asepticity and absence of chemical changes, but sooner or later trouble arises.* The author mentions the history of such an eye enucleated twelve years after the injury; the radiogram was negative, yet a foreign body was present.

P. A. HARRY.

(3) It seems unfortunate that there is no record of any discussion having taken place on the case shown by **Eason**, of London. A piece of steel could be seen in the eye, lying on the retina. The eye was quiet after lodging the intruder for seven weeks. Eason expressed the opinion that nothing should be done. Whether this opinion met with approval or disapproval is not indicated, although views on the subject were asked for.

ERNEST THOMSON.

XII.—REMEDIES.

(*Fourth Notice.*)

(1) **Maucione.—Neo-salvarsan in the treatment of syphilitic affections of the eye and its adnexa. (Il neo-salvarsan nella cura delle affezioni sifilitiche dell'occhio ed annessi.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

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* Lister expresses a contrary opinion, see p. 249 of the present number.—Editor.

(2) **Mihail.—Experiments on intra-ocular therapy. (Essais de thérapeutique intra-oculaire.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(3) **Stanculeanu, G.—A contribution to the study of the cytochemistry of the aqueous humour in eye diseases and its changes under the influence of subconjunctival injections. (Contribution à l'étude de la cytochimie de l'humeur aqueuse dans les affections oculaires et ses changements sous l'influence des injections sous-conjonctivales.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(4) **Darier, A.—Vaccines and serums in ocular therapy. (Vaccins et sérums en thérapeutique oculaire.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(5) **Jacovides.—Autoorotherapy in ophthalmic treatment. (De l'autoorothérapie en thérapeutique oculaire.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(6) **Lotine, A. W.—The tubercular keratitides and their treatment by tuberculin. (Les kératites tuberculeuses et leur traitement par la tuberculine.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(1) In the opinion of **Maucione,** of Naples, neo-salvarsan is preferable to salvarsan on account of its simpler *technique* and the absence of signs of intolerance. He agrees with those observers who state that neuro-recurrences are not due to the drug, but to new manifestations of the disease. The results of neo-salvarsan treatment have been best in acute and subacute inflammatory affections, less marked in the chronic and hereditary forms, and negative in the degenerative forms. If the disease appears to be cured, but the Wassermann reaction is still positive, Maucione advises continuance of the neo-salvarsan in smaller doses, combined with the administration of mercury and potassium iodide. A. J. BALLANTYNE.

(2) **Mihail,** of Bucharest, describes the results of two series of experiments. The first series was designed to determine the action of salts of silver and mercury injected into the anterior chamber of the normal eye. The substances used were collargol, protargol, silver nitrate, and bichloride and cyanide of mercury. All these gave rise to necrotic changes in the posterior epithelium of the cornea, Descemet's membrane, and the anterior epithelium of the iris; œdema of the corneal stroma and iris; and evidences of regeneration in the epithelial lining of the anterior chamber. The iris changes were most marked with the mercury salts, and their irritative action seemed to play an important part in the regeneration of lesions of the anterior part of the eye.

In the second series of experiments the author studied the effects of the drugs, chiefly cyanide of mercury, injected intra-ocularly in pyogenic affections of the anterior part of the eyeball. In such conditions, in spite of the toxic action of the salts on normal tissues, the results were favourable.

Mihail concludes that injections of solutions of the salts referred to into the anterior chamber may be employed: (1) as antiseptics in cases of pyogenic infection (wounds, ulcers, etc.) and (2) as specific remedies in parenchymatous keratitis and syphilitic iritis. In the latter case they act both specifically on the local disease and as adjuvants to the internal specific treatment. They are believed also to obviate recurrences. A. J. BALLANTYNE.

(3) The following are some of the results of the researches of **Stanculeanu,** of Bucharest:

1. *Biochemistry of the aqueous in affections of the eye.*

In glaucoma, especially acute glaucoma, there is increase both of organic and of inorganic matter in the aqueous. In parenchymatous keratitis, if the tension is elevated, the chemical composition of the aqueous resembles that of glaucoma. In the initial period of iritis there is an increase of organic matter. In albuminuric retinitis there is increase of the organic matter without elevation of tension.

2. *Effects of subconjunctival injections.*

Subconjunctival injections of cyanide of mercury cause increase of both organic and mineral contents of the aqueous. Injections of 10 per cent. sodium chloride have the same effect in lesser degree, while 10 per cent. solutions of iodide of sodium have been found to pass into the aqueous and vitreous.

3. *Cytology of the aqueous in eye affections.*

In the presence of inflammatory disease of the eye, there is a cytological reaction in the aqueous, proportional to the intensity of the inflammation. There is no relation between the cytology and the ætiology of the affection.

A. J. BALLANTYNE.

(4) **Darier**, of Paris, contributes a short note which chiefly emphasizes the benefits to be derived in many cases from paraspecific therapy. The period during which a bacterial diagnosis is being obtained is valuable for treatment, and should not be lost. One should administer any active immune serum available, *e.g.*, antidiphtheritic, and it may be given by the mouth in a dose of 20 c.c. It will not have a specific curative effect, but it will relieve the pain, fever, and insomnia, and will render the specific and local treatment more efficacious. Darier states that oral administration of sera avoids the risk of anaphylactic accidents. A. J. BALLANTYNE.

(5) Briefly, the treatment described by **Jacovides**, of Alexandria, consists in raising a blister on the arm, drawing off the serum by means of a syringe, and injecting it subconjunctivally. The method was introduced by Röhmer. The author claims to have obtained good results by this method in cases of septic ulcer, irido-cyclitis, inflammation following cataract extraction, etc. He got twenty cures in twenty-five cases of hypopyon-ulcer. He believes that the serum, which contains many polymorphs., etc , aids the local cells by an active phagocytosis. A. J. BALLANTYNE.

(6) **Lotine**, of Petrograd, says there are three forms of keratitis of tuberculous origin. There is, in the first place, a typical tuberculous parenchymatous keratitis, distinguishable from parenchymatous keratitis of syphilitic origin by certain characteristics. It presents a more or less diffuse opacity limited to one part of the cornea. It never invades the whole cornea. Small points of whitish-yellow infiltration are found in the middle and deeper layers of the cornea, like isolated tuberculous nodules, usually peripheral, but sometimes central. Vascularity is never so pronounced as in the vascular form of syphilitic keratitis. Sometimes, in addition to these clinical features, we find episcleritic nodules or infiltrates near the limbus, periodic eruptions of miliary phlyctens, typical scleritis, or iritis with tubercles. The affection is usually monocular, but may affect both eyes.

The second form described is a simple parenchymatous keratitis characterised by diffuse opacity, occupying part only of the cornea and with slight pericorneal injection.

The third form is the typical scrofulous or phlyctenular kerato-conjunctivitis. He suggests that it might be called paratuberculous keratitis, since there is a tendency to look upon scrofula as an attenuated tuberculosis or paratuberculosis.

Lotine, then, thinks that keratitis of tuberculous origin is more common than is generally supposed, and that most of the cases can be distinguished from those of syphilitic origin by careful examination. There are nevertheless cases of tuberculous parenchymatous keratitis of a diffuse kind impossible to distinguish from those of syphilitic nature. The differential diagnosis is facilitated by general bodily examination, and by the use of the Pirquet and Wassermann tests.

He finds that tuberculin treatment can usually be carried out in the polyclinic, and that it gives good and lasting results. He employs chiefly T.R., but also adopts Bernheimer's plan of giving a four to six weeks' course of B.E. followed by a course of Petruschky's cutaneous method, in which the patient rubs into the skin of the arms from one to five drops of Albumose-free Tuberculin (T.A.F.), diluted one in five with glycerine.

A. J. BALLANTYNE.

BOOK NOTICE.

An Introduction to the Study of Colour Vision. By J. HERBERT PARSONS, D.Sc., F.R.C.S. Cambridge: at the University Press. 1915. Price, 12s. 6d.

This book does not profess to be, and is not, a handbook or textbook upon Colour Vision. The ordinary ophthalmic surgeon, whose temperament is clinical rather than physical, will find little to interest him, and, frankly, will encounter much that he cannot fully comprehend unless he is well acquainted with the apparatus and experimental methods employed in the optical laboratory. On the other hand, the pure physicist or the physiologist, who wishes to make an exhaustive study of the problems of colour perception, will value the book, which contains a comprehensive synopsis of the research work which has appeared during recent years. The bibliography is very complete, and the student who takes the book chapter by chapter and reads all the monographs summarised therein will have a complete knowledge of the purely scientific aspect of colour vision. On the other hand, the clinician will be disappointed if he expects a judicial discussion of the nature and value of the methods he should use in testing for colour blindness. For example, Holmgren's wools (so beloved by the author), are only incidentally mentioned.

The book is divided into three parts: the first treats of the chief facts of normal colour vision; the second is concerned with the chief facts of colour blindness; and the third is headed, the chief theories of colour vision. Section I of part I is devoted to the physical, anatomical, and physiological basis of colour vision. Section II treats of the light-adapted or photopic eye, and Section III of the dark-adapted or scotopic eye. Section IV discusses regional effects, the field of vision for colours, and the macula lutea and fovea centralis. Section V is headed—temporal effects, and includes recurrent vision, the Talbot-Plateau law, and the Flicker Phenomenon. In Section VI we are introduced to simultaneous contrasts and the local quantitative effect. The last section, the most interesting, describes the evolution of colour vision: it contains four chapters, an introduction, an account of the comparative psychology of colour vision, of the colour vision of primitive races, and of the development of colour vision in the child.

On page 52 we are told that the dark-adapted eye is totally colour blind. This is not the case, for as we are informed on page 61 "even with very good dark-adaptation, a red light beyond 670 $\mu\mu$ excites the sensation of red." Gotch showed that the dark-adapted eye could perceive a red light whose intensity was gradually diminished as long as any sensation of light could be appreciated. On the other hand, he demonstrated the fact that a green or blue light gradually diminished in intensity was seen in its true colour only down to a certain degree, when it suddenly flashed out white, the white sensation being of a much higher intensity than the previous green or blue. These experiments were demonstrated by the late Professor Gotch at the Ophthalmological Congress at Oxford in 1912. The fact that the dark-adapted eye cannot appreciate the red of a geranium in dim light is no proof that it is unable to respond to red. It is necessary first to prove that any red rays are reflected by the flower.

Under the heading of "Fatigue" on page 113, allusion is made to Burch's experiments, and on page 115 his results are compared with those obtained by Marshall and Edridge-Green, whose experiments, we are told, did not produce nearly so complete a fatigue of the sensations as that attained by Burch. We believe, however, that we are correct in saying that Burch used light of such a high intensity that his retina was permanently damaged, and that he in fact suffered from a condition analogous to eclipse blindness. If this be so, his results would lose much of their value.

The chapter upon the colour vision of primitive races is of great interest, and seems to suggest that there is at least no evidence in favour of Edridge-Green's theory that violet is a colour which appeared early in the development of the human race. All the facts so far collected lend colour to the opposite view, but as Myers points out, "language affords no clue to sensibility." The reviewer's experience of the Arab races is that the Arabic words used by them have a very definite colour value. Rivers examined the upper Egyptian natives, and states that the words have no exact significance. Parsons on page 148 quotes him as saying that *azrak* (fem. *zerka*) is never used for light-blue, and is also used for black. As a matter of fact, the word *moyezerka* means blue water in the eye, the term invariably used for cataract. The word used for black is *asmar*, not *azrak*. These mistakes only show how fallacious experiments upon natives can be when made by one not thoroughly acquainted with their language and habits of thought.

A large part of the last part of the book is devoted to the Young-Helmholtz and Hering theories, which are explained algebraically and geometrically; in fact, the whole book is replete with formulæ, logarithms, and graphs which are somewhat meaningless to the ordinary clinician, although illuminating to the mathematical physicist. The chapter upon the duplicity theory is valuable, and the arguments advanced make it appear highly improbable that Edridge-Green is correct when he suggests that the rods are not active visual agents. In fact, a careful study of the theories as stated, only leads to the conclusion that not one of them accounts for the facts, and that they are in consequence mere hypotheses. The Edridge-Green theory has the place of honour in the book, being considered last of all under the heading "other theories." The destructive criticism devoted to it only proves, and it does, in our opinion, prove, that we cannot accept the whole of the theory, although upon the whole it appears to be more in harmony with the facts than any other.

We have read the book carefully from cover to cover, and we consider that it is a most valuable *résumé* of the facts, considered from the standpoint of the physicist. The ordinary ophthalmic surgeon will find it somewhat disappointing, as we have done. T. HARRISON BUTLER.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

THE BEST MATERIAL FOR THE FRAMES OF SPECTACLES FOR HARD-WORKING MEN.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—As I now see, by an omission of mine, my article in THE OPHTHALMOSCOPE, February, 1915, p. 71, does not contain a word about the important question of the material best fitted for the frames of spectacles for hardworking, perspiring men.

The material must never be steel, because perspiration will rust it; and consequently the spectacles will soon be broken. Nickel-plating of a steel frame will only delay its becoming rusty.

A *solid* nickel frame, as in the spectacles used by Amundsen and Hansen, shown in fig. 3 in my article in THE OPHTHALMOSCOPE, is the best material—cheap, strong, and will never be damaged by perspiration.

The usual closed goggles for chauffeurs and airmen may be good for these sedentary sportsmen.—Yours truly, S. HOLTH, M.D.

CHRISTIANIA,
NORWAY.

THE INTRA-OCULAR PRESSURE AND THE TENSION OF THE EYE.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—I beg to suggest that Col. R. H. Elliot's article on the intra-ocular pressure and the tension of the eye, though described as a "review," would be more suitably entitled a special plea for accepted traditions.

The special pleader may find it convenient to neglect to note the facts brought forward by the other side, but the scientific reviewer can hardly claim to do so.

I think, therefore, that before attempting to write on and review the physical conditions regulating the intra-ocular pressure Col. Elliot might have taken the trouble of verifying for himself the fact that the slightest touch on the eyelids produces constriction of the central retinal veins.

This fact proves, as discussed in my paper read before the Ophthalmological Society last year, and recently reviewed in your columns, that the intra-ocular pressure always lies at the same level as the venous pressure at the points of venous exit in the eye.

Leonard Hill has experimentally shown that in the brain, with its rigid walls and fixed total volume, the pressure in the torcular Herophili (a point of venous exit in the brain) is the same as the intra-cranial pressure, and it is open to anyone who can make use of an ophthalmoscope to see that the same conditions exist in the eye.

The statement, therefore, that the corneo-sclera is a closed sphere analogous to the cranium, with its rigid walls and fixed contents, is not a mere assumption.

The analogy between the eye and the brain is complete, and the level of pressure at which their contents lie is the same, *i.e.*, the venous pressure at the points of venous exit. This fact in the one case has been proved experimentally, in the other it is open to clinical observation.

Considering that the ophthalmoscope has been in use now for over fifty years, it is nothing short of lamentable the amount that has been written about what we feel when we apply pressure to the eye, when all that was necessary to interpret our sensations was to see what we were doing.—I am Sir, yours, THOMSON HENDERSON.

OFFICERS' QUARTERS,
NETLEY, HANTS,
12th April, 1915.

NOTES AND ECHOES.

Death.

IT is with deep regret that we have to record the loss of that veteran ophthalmic surgeon, William Arthur Brailey, who died after a few days' illness at 11, Old Burlington Street, W., on April 8th last. He was laid to rest on the following Sunday in the old-world Sussex village of Warbledon, the casket being carried to the primrose-lined grave by six stalwart yeomen clad in the picturesque smock frock that still lingers in that part of England. Truly a fitting end for one who valued simplicity as Brailey did.

The key note of Brailey's life was work. Born in 1845 at Uttoxeter, he was the son of the Reverend William Brailey. At the tender age of eight he was sent to a school which enjoys a great reputation among nonconformists, Woodhouse Grove School, where he remained for the next six years. He was then coached for the London Matriculation, which he passed at the age of sixteen years with first-class honours. He next entered at Guy's Hospital, but his health proving unsatisfactory, he joined his father at Cambridge, where the elder Brailey had charge of a church. It was not long before our colleague gained an open scholarship at Downing College, and so well and wisely did he order his time that in 1867 he was placed second in the first class in the Natural Science Tripos. Meanwhile he had taken an exhibition in biology at the preliminary scientific examination for the M.B. London, and had taken the B.A. degree of that University. In 1871 Brailey took the M.B. at Cambridge, and was elected a Fellow of Downing College. He remained for some time at Cambridge, where he acted as a "coach" in the Natural Sciences. But in 1873 he married Agnes, daughter of John Robertson, and shortly after that entered general practice at Witham, Essex. At the end of ten months he returned to London, rejoined Guy's Hospital, and became attached to the Moorfields Eye Hospital. At the former he was elected demonstrator of comparative anatomy and zoology (1878—1886), and at the latter he became librarian and curator. He remained at Moorfields from 1875 to 1881. He was appointed assistant ophthalmic surgeon to Guy's Hospital in October, 1882, and held the office until his retirement on reaching the age of sixty years in August, 1905. At the time of his death he was consulting ophthalmic surgeon to that institution.

In 1880 Brailey took a prominent part in founding the Ophthalmological Society of the United Kingdom, the first president of which was Sir William Bowman, with whom Brailey had formed a lasting friendship. He acted at various periods as vice-president, secretary, and councillor, and many communications from his by no means ready pen will be found in the first few volumes of the *Transactions* of the Society. Most of his contributions to the literature of ophthalmology were published in the *Royal London Ophthalmic Hospital Reports*, *Guy's Hospital Reports*, and the *Transactions* of the International Medical Congress held in London in 1881 and Berlin in 1890. He was the joint author of the article on diseases of the iris and ciliary body in Norris and Oliver's *System of Diseases of the Eye.* We do not forget that he was among the contributors to the first number of THE OPHTHALMOSCOPE (July, 1903).

The tale of Brailey's distinctions is by no means complete. In 1885-86 he was Hunterian Professor at the Royal College of Surgeons of England. In 1890 the Middlemore Prize was conferred upon him by the Council of the British Medical Association. Within recent years he was elected an Honorary Fellow of Downing College, Cambridge.

Brailey's association with Sir William Bowman, which extended over a good many years, was a determining factor in his life. He did much work for Bowman, and after the latter's death largely succeeded to his practice.

Brailey is survived by his widow and two sons, one of whom helped his father in practice until the outbreak of war, when he joined the Navy. The other son, Major William Herbert Brailey, served with the C.I.V. during the South African War, and mobilised with the 2nd Eastern General Hospital at the outbreak of the present war.

Brailey never enjoyed robust health, but his determination to accomplish his work in spite of personal weakness was remarkable. Conscientious to a degree, Brailey's professional opinion was sought after, not only by general practitioners of medicine, but by his colleagues as well. He could always be depended upon to take a broad and philosophic outlook upon the case. For many years he enjoyed an exceptionally large private practice.

Under a somewhat cynical exterior, Brailey managed imperfectly to hide a heart of gold. He was a benefactor in many directions. R.I.P.

Mr. Walter Edmunds writes as follows :—"To natural abilities Mr. Brailey added great industry, all the more praiseworthy because handicapped by uncertain health. He was a shrewd and exceptionally accurate observer, also a man of wide sympathies, who made a pleasant companion and an excellent host. The short holidays he allowed himself were spent in earlier life in travel or yachting, and latterly on his farm. As he had comparatively little time to give to interests outside his home and his professional work a fitting close to an arduous life would have been a few years of cultured leisure among the hills of Sussex, but that was not to be."

THE OPHTHALMOSCOPE DIARY.

1915.

Midland Ophthalmological Society.	June 1st.	Shrewsbury.
Royal Society of Medicine : Section of Ophthalmology	June 9th	1, Wimpole Street, London, W.
American Ophthalmological Society	July 6th & 7th	New London, Conn.
Oxford Ophthalmological Congress	July 15th & 16th	Keble College, Oxford.
American Academy of Ophthalmology and Oto-Laryngology	Oct. 5th to 7th	Chicago, Ill.

THE

OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

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ORIGINAL COMMUNICATIONS.

PROGRESS IN THE TREATMENT OF CATARACT IN INDIA.

BY
LT.-COL. HENRY SMITH, V.H.S.
(I.M.S.)
CIVIL SURGEON, AMRITSAR, PUNJAB, INDIA

THE accompanying table, extracted from the official records, shows the progress in the treatment of cataract in India, except in the minor provinces and native states, statistics of which I have been unable to obtain. It sets forth the work done in the past by the Indian Medical Service, and the work we are now doing.

It was in the late seventies that cataract extraction in India came into existence. Before that time the treatment of cataract was in the hands of the immemorial indigenous "lens coucher." All the progress we have made has been at his expense. The Punjab is his home. All over the Punjab we come across villages named Rawal Pindi, that is Rawal's town ; Rawal signifying the caste of lens coucher. From the Punjab at the end of the hot weather he migrates all over India ; a number of these men go to Europe and return at the beginning of the following hot weather.

STATISTICS OF THE CATARACTS OPERATED ON IN THE LEADING PROVINCES OF THE INDIAN EMPIRE.

Year	Punjab & North-West Frontier Province.	United Provinces of Oudh & Agra.	Bengal including Calcutta.	Madras Presidency & City.	Bombay Presidency & City.	Central Provinces.
1881	265	2,640	357	—	-	—
1882	507	3.321	350	480		—
1883	435	4,641	391	255	193	27
1884	500	6,048	500	222	230	16
1885	948	6,048	703	443	197	57
1886	1,501	5.500	551	407	219	112
1887	2.450	5.025	635	511	322	110
1888	2,658	5,966	803	730	266	114
1889	3,857	6,739	1.235	749	265	109
1890	4.013	7.015	2.017	1,227	316	219
1891	4,482	9.445	1,683	1,103	290	174
1892	4,294	8.880	1,597	1.307	355	253
1893	5.300	9,124	1,481	1.271	362	479
1894	5.305	9,222	1.407	1.233	407	949
1895	6,216	10.563	1.013	1,234	487	1,299
1896	5,323	8,923	2,845	1,425	490	1,508
1897	4,667	6.514	3,134	1.562	382	964
1898	4.534	5.613	2,560	1,222	523	1,020
1899	5.319	5.734	3,051	1.301	578	945
1900	5.014	5.071	2.802	1,472	697	733
1901	6,590	5,787	3.150	1,621	709	903
1902	5,909	5,335	3,885	1,495	879	789
1903	6,107	5,157	3,537	1,418	942	568
1904	7,465	5.023	3.514	1,346	1,012	681
1905	7.029	4,994	3.953	1.140	917	777
1906	8.317	6,421	3,653	1,232	1,010	828
1907	8,122	5.508	3,866	1,404	962	871
1908	8,099	5,474	4.322	1,034	985	973
1909	11,156	5,442	4,145	1,442	1,238	1,042
1910	11.307	6.165	4.266	1,187	1.419	763
1911	12.200	6,829	4.953	1,344	1,424	888
1912	15,576	8,846	2,464	1,526	1.467	922
1913	16,236	9,005	1,291	1,655	1.586	—

Total for the above provinces—31,598.

Population Census, 1911 :

	Punjab & North-West Frontier Province.	United Provinces of Oudh & Agra.	Bengal including Calcutta.	Madras Presidency & City.	Bombay Presidency & City.	Central Provinces.
	22,171,889	47.182,044	79,973,084	41.405,404	19,672,642	13,916,308

The statistical table does not indicate the amount of cataract in India, but merely the amount which has come under modern treatment. When the figures concerning the Punjab are examined, it will be seen that, as in the other provinces, results were becoming stationary up to, roughly, the year 1898. Shortly after that date I began to teach extensively and to advocate intracapsular extraction, so that it has now become practically the operation of election in the Punjab. The progress made in the Punjab since 1900, when compared with that of the other provinces, speaks more in favour of intracapsular extraction than volumes of academic disquisition.

The Punjab and N.W. Frontier in 1881 had 265 cataract operations; in 1913, 16,236. The United Provinces and Oudh in 1881 had 2,640; in 1913, 9,908. Bengal Provinces with Calcutta in 1881 had 357; in 1913, 1,291. Madras Presidency and City in 1882 had 480; in 1913, 1,655. Bombay Presidency and City in 1883 had 193; in 1913, 1,586. The Central Provinces in 1883 had 27; in 1912, 922.

The phenomenal progress since 1900 in the Punjab, compared with the other Provinces of India, is undoubtedly due to the superior results obtained by intracapsular extraction. Nothing can controvert these facts. As far as matters surgical are concerned, those who are familiar with the Punjab know that we are dealing with a highly utilitarian people– a people who go entirely by results. Intracapsular extraction is beginning to extend rapidly to other provinces, and when it is extensively adopted, I expect to see progress in these provinces similar to what we have in the Punjab. It is being noticed by all who adopt the operation in other provinces, that the cases in their hospital rapidly increase in number at the expense of hospitals which adhere to Daviel's operation, thus showing clearly the patients' opinion regarding the comparative excellence of the two operations. I personally believe that it will not be many years before intracapsular extraction is the operation of election throughout the Indian Empire, and that those who stand out against it will disappear from want of material. The table above shows that we do over 31,000 cataracts a year in the Indian Empire, more than half of these operations being performed in the Punjab, with its 20 millions of people, the population of the Indian Empire being 315 millions. Twenty years hence there will be, I think, more than 60,000 cataracts a year coming under modern treatment in the Indian Empire. The fact that less cataract comes under modern treatment in other provinces than in the Punjab does not indicate that there is necessarily less cataract in these provinces. It does indicate that we have not secured the confidence of the patients in the same degree as we have those in the Punjab.

I think, without encroaching on other men's work, I may claim to have established intracapsular extraction of cataract in the Punjab and in many other places in India. I do not claim to have been the first man to extract cataract in the capsule. Intracapsular extraction has been the dream of ophthalmologists since the days of Daviel. It has been tried by a number of men we know, and probably by many others whose names we do not know. Their methods were so imperfect, that the risks associated with the procedure made it prohibitive, so that at the present hour they would all have ceased to exist.

I do claim that every detail associated with my name has been worked out by myself independent of even a suggestion from any other man; as, for instance, the method of completely exposing the conjunctival sac for disinfection and for exposing the field for the operation; the method and the importance of controlling the orbicularis muscle; the different methods of dealing with the different types of lens; the fact that an eye should not be subjected to meddlesome dressing any more than any other surgical wound, etc.

Any one of the technical details which I have pointed out may, in itself, look trifling. It is only the experienced operator who comes to recognise their importance, and combined these details constitute a method which, as many of my pupils have shown, is not subject to greater loss of vitreous humour than the operation of Daviel in the same hands.

I have also shown that a cataract may be extracted at any stage of its immaturity as safely as when mature. I have thus established it as an operation which is destined to live, and, in my opinion, to take the place eventually of Daviel's operation, as distinguished from previous evanescent methods of intracapsular extraction.

I also claim that I have been the first man to teach the mechanical side of surgery as the mechanical side of any other art is taught. The practice universal in Europe and America is to teach the mechanical side of the surgical art by means of lectures and demonstrations. What other mechanical art is taught in this way? The procedure I adopt in teaching is to show the pupil in a considerable number of cases the method of operation, pointing out the importance of every detail. The pupil is then set to perform the operation before me on the living subject in a large number of cases. He is instructed as he proceeds; the mistakes he is making are pointed out and the reasons given; and I come to his relief in case of difficulties. A short course of training of this kind makes a man a more efficient operator than a lifetime of lectures or of looking at demonstrations. One advantage in this method of teaching is that it establishes the confidence of the operator in himself, which no other method does, or else forces him to decide that he had better confine himself to the physician's art. I have had as pupils a large number of the I.M.S., of the R.A.M.C., and of the different missionary societies, together with Hindus, Mahomedans, Parsis, official and non-official, without respect to colour, caste, or creed. I have had surgeons from Great Britain, Australia, Canada, and especially from the United States. To teach men this way is a very strenuous and tiring task, as will be understood when the welfare of the patient is my responsibility and must be the first consideration.

This teaching I have been doing single-handed and alone, unrecognised by Government, in an institution grossly under-staffed and financially starved. It will be understood how much strain is involved when it is stated that the work I have personally done includes more than 35,000 cataract operations, with a corresponding proportion of other ophthalmic operations. It also includes as much general surgery as that done by any other man living. In addition to all this, I have had my official work, the management of a jail during most of the time, the administration of the sanitation, medical charities, and medico-legal work of a district of close on a million people. It is needless to say that I could not cover in teaching the whole field of ophthalmology, in addition to my other work. It would take a " superman " to do that.

Considering that post-graduate schools in the different branches of medicine are springing up over the Indian Empire, and the amount of material represented by the foregoing statistics, it is surely time that we had a post-graduate school to teach the subject to those pursuing a career in ophthalmology in the Indian Empire. We should not leave post-graduates to the meagre material of our alien enemies, since it is to Vienna or Berlin men go for post-graduate instruction, rather than to Great Britain. I would point out that the number of cataract operations in London in the year does not exceed 400—600, and in Vienna there are few more. It may be said that this is not the time to raise an issue of this kind, when the Empire is in labour. I contend that this is just the time when "the spirit is on the waters." The spirit is abroad throughout the Empire that we should develop our own industries, and not be dependent on other countries, a sentiment with which I whole-heartedly agree. Why should not India take its position in the scientific field of ophthalmology, since it has incomparably more material than any other country in the world? It is a subject which surely appeals to every man in India.

All that we require to establish a school of ophthalmology in India is money. I hope our patriotic fellow citizens will respond to the crying need of the land of their birth. A school of this kind must be properly manned and financed. Its incumbents should not be paid on the principle that they are to eke out a meagre existence by means of private practice, competing with men who will do a cataract operation for two rupees. If it is to be a success, their pay and prospects should be so ample as to attract the best men available, as the prospect of private practice for such men may safely be calculated as approaching *nil* from this time onwards. The Government is advancing rapidly as regards the improvement and development of their medical schools for under-graduates. Government is also instituting research schools and schools of tropical medicine all over India for post-graduates. But nothing has been done to promote instruction and research in post-graduate surgery. The gulf which stands between European and Indian is being very slowly bridged. Among the builders of this bridge the surgeon stands out pre-eminently. It is he who has paved the way for modern sanitation and modern medicine, although both are yet in their infancy. From the sweeper to the gaddi the surgeon comes most closely in touch with the real life of the people, and their aspirations. He is their friend and confessor, so to speak; a man of no political authority, and in no way connected with the "taxation of the poor," or "the punishment of the innocent." Surgery makes an infinitely greater appeal to the people of this country than medicine. The indigenous medicine man still flourishes under the shelter of superstition and fate, neither of which can shelter the surgeon's art; hence the fact that surgery is the pioneer and paves the way for medicine. Of post-graduate schools, one for surgery and surgical research should, I think, lead the way. It is a mistake to think that because there are a large number of Indians becoming qualified in medicine, therefore medicine may safely be left to take care of itself in India. India never required higher class men than it does at present, and will do for many years to come, to lead the newly-fledged profession in the way which experience in Europe and America has indicated, with all its humanitarian, scientific, and æsthetic aspirations. The whole tendency of the Indian profession, becoming so rapidly produced, is competition for fees, thus reducing fees to such a low scale that it is impossible for such a profession to devote any attention to the development of the scientific side of its art, the whole tendency being to reduce the profession to a mere trade, in which he who advertises widest reaps the biggest financial advantage.

We are told that Indians do not possess the scientific spirit. I think there is much truth in this statement at the present time. The study of science is but in its infancy in India. We cannot therefore expect to see its people realising the seductive satisfaction to be gained by scientific research, and its application to the alleviation of human suffering. Yet a people who, for ages past, have produced so many ascetics prepared to work through life for spiritual idealism, despising material welfare, has surely unlimited future possibilities of producing men who will give their lives to the interests of science, which are the interests of humanity.

The objects of this school which I advocate are.—The study and teaching of the causes and prophylaxis of the many diseases to which the eye is subject in India. The teaching, both theoretically and practically, of the methods of treatment of diseases of the eye. Lastly, the utilization of our material to such a degree that men and women from all the world over will come for instruction to India.

A CASE OF ACUTE PRIMARY PNEUMOCOCCAL CHOROIDITIS.*

BY

J. GRAY CLEGG, M.D., F.R.C.S.,

MANCHESTER, ENGLAND.

Case.

THE patient, B. G. H——, a healthy-looking, but rather undersized young man, 27 years of age, came to see me on December 2nd, 1908, complaining of the vision of the right eye.

The history was that eight days previously he had noted muscæ, which were more pronounced during the last two days, and on the 1st inst. the sight had failed.

Examination gave R.V. = J. 20. L.V. = 6/36—2 D. sph. with —0.5 D. cyl. = 6/6 and J. 1. That the defect of the right was recent I knew from the fact that on October 19th, 1905, I had tested him and found the R.V. = 6/36 — 1.75 D. sph. with — 0.5 D. cyl. = 6/6 and J. 1. The media were then clear and the fundus was normal.

There were no external signs, and the media were clear, but the disc was slightly blurred and the retinal vessels were full. Two whitish areas, with fairly defined margins, were visible, one above and one below the fovea. The upper one was roughly oval, and the vertical long diameter was about 1½ times that of the optic disc; the lower was crescentic, with the concavity upwards, also 1½ disc diameters in length.

Thorough investigation of the family history and of the patient's general condition by Dr. Alan Boyle, of Disley, gave no tangible clue as to cause.

On the 3rd December, slight injection of the conjunctiva appeared. By the 5th, the iris was slightly discoloured, and the anterior chamber was rather deeper than normal. The cornea showed a little haze, resolvable by the *loupe* into fine lines. No deposits on Descemet's membrane. There was distinct haze in the vitreous; the exudates were much enlarged; and the disc was only just visible.

Course, Progress, and Treatment.

The eye was seen by Dr. A. Hill Griffith, who concurred with me in thinking that the most probable cause was tubercle. On the 7th, Mr. E. Treacher Collins independently expressed the same opinion.

On the 8th, the eye was more irritable, the cornea was hazy, anterior chamber deep, pupil wide with large dilated vessels in the iris; vitreous full of opacities, areas of exudation very indistinct, and disc not visible. *December 9th*, opsonic index (taken by Dr. G. E. Loveday) reported to be 0.9. Treatment: hot bathing, atropin drops, grs. 2. ad. ℥j. Open air, overfeeding. Ol. morrhuæ. *December 11th*, The injection of eye was less, cornea clearer. Anterior chamber still deep, pupil medium. Dull red reflection. Subcutaneous injection of 1/30,000 m.grm. of bovine tuberculin. *December 14th*, cornea clearer. Fundus just visible above, but directly down a dirty white reflection was to be seen. Opsonic index, 1. Injection of 1/30,000 m.grm. repeated. On the 17th, the cornea was clear, iris intensely congested, and pupil smaller. Injection changed to human tuberculin. *December 24th*, T. +. General inflammation more marked; some hypopyon. Dr. G. E. Loveday reported that the index to bovine tubercle was now 2, showing the disease was not due to that variety. So far the index for human had been 0·75, but to-day it had gone up to 1·33 after the one injection of human tuberculin.

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* Read at the meeting of the Ophthalmological Society of the United Kingdom, April, 1915.

December 28th.—Fully developed panophthalmitis. Anterior chamber almost full of exudate. T. full. Slight tenderness. V. = bare P. L.

December 31st.—Chloroform was administered. The cornea was incised, and specimens of the fluids taken. The cornea was then removed, and the whole of the interior of the scleral cavity scooped out and preserved. Nothing of interest occurred in the stump afterwards.

The pneumococcus alone was found in the specimens. The vitreous and choroid, after being kept in a closed bottle in the cold for six days, during which the cocci would die, were then introduced under the skin of a guinea pig, which was afterwards killed and examined, but no sign of tubercle was found.

The other eye remained perfectly healthy. It was examined only last week.

Comments.

The case is of especial interest in that:—

(1) It was seen in a very early stage in an eye known to be previously healthy.

(2) It was mistaken by three ophthalmic surgeons for a tuberculous lesion, and the inflammatory signs were supposed to be due to toxins arising from that lesion.

(3) No primary seat of infection was discovered in any part of the body after repeated and most careful investigations by several medical men. The heart was normal. The existence of two foci at the first examination excluded neoplasms and parasites.

In the whole of my experience, I do not remember a similar case.

Suppuration in a globe is commonly the result of pneumococcal activities, but in other cases there has been some definite lesion elsewhere, or there has been a penetrating wound, allowing direct infection from without.

I shall be glad of any suggestions which will enable me to diagnose such a case in the early stages and to differentiate it from acute progressive tubercle.

CLINICAL MEMORANDUM.

A CASE OF SUBCONJUNCTIVAL HÆMORRHAGE, APPARENTLY DUE TO CENTRIFUGAL FORCE.

BY
A. Alison Bradburne, F.R.C.S.E.
MANCHESTER, ENGLAND.

The apparently unique causative factor in this case merits its record :

A member of a troupe of acrobats, a girl aged twenty-one, consulted me about her eyes, in which were plainly evident subconjunctival hæmorrhages. A deep crimson-lake discolouration surrounded three-quarters of the globe of the right eye, leaving unaffected only the upper nasal segment. A similar but less extensive hæmorrhage occupied the outer and lower quadrants of the left globe. The skin of both upper eyelids had a distinctly yellowish tinge, most intense along a line corresponding to the upper border of the tarsal "cartilages." The vision and fundi were normal, and there was nothing of a local or constitutional nature to account for the condition. The patient said she first noticed it fourteen days previous to her visit to me, stating it appeared as a blood-stained spot in the white of the right eye twenty-four hours after her first experience in a "turn" (new to her) called the "tourniquet turn." In the performance of this feat she is suspended by a belt round the waist, from a strap which a fellow acrobat holds between her teeth whilst hanging from a trapeze. The patient is then rapidly spun from left to right about three dozen turns around a vertical axis, which action obviously drives the blood to the extremities, and is sufficient to account for the localisation of the hæmorrhage, first in the right eye, and later in the left.

A further point of interest would seem to attach itself to this case in regard to the liability of the girl's employers from the point of compensation. Can it be regarded as an accident the outcome of employment, and would she be legally entitled to compensation if unable to carry on her performance ? In an older person the liability to cerebral hæmorrhage from the same cause would be a sequel of almost certain occurrence, but in such individuals the onset of headaches would in all probability act as a warning deterrent.

REVIEW.

"BLUE SCLEROTICS :"

A Note upon the Bibliography of the Syndrome.

BY
Sydney Stephenson.
London, England.

It is now more or less widely recognised that "blue sclerotics" form merely part of a symptom-complex, the other components of which include small stature and a peculiar tendency to spontaneous fractures, dislocations, and sprains. It is suggested that in these people there is a deficiency or weakness of the fibrous structures throughout the body, including the sclera.

It has occurred to the writer that the present is a fitting time to analyse briefly the somewhat scattered communications that have led to the construction of the group as outlined above.

To v. Ammon[1] appears to be due the first reference to "blue sclerotics." Writing in the year 1841 he spoke of a peculiar bluish-white colouration of the sclera that may be encountered in cases where the whole development of the eye is backward. A passing reference to a similar condition was made in 1848 by C. A. E. Cornaz[2], and in 1862 by Sir W. R. Wilde.[3]

Upwards of forty years later Leslie Buchanan,[5] of Glasgow, described an unusually thin corneo-sclera that he had found on pathological examination of the eye of a girl of nine years, which had been removed on account of an injury. The cornea was three-fifths and the sclera one-third of the normal thickness, and the fibres, although of natural size, were unusually few in number. Bowman's membrane was absent. In 1907 Percival J. Hay,[6] of Sheffield, under the name of "pseudo-coloboma," described a congenital anomaly of the sclera in a still-born hydrocephalic child, who presented many other deformities. One eye showed a triangular area, as dark as the pupil, in the sclera on both inner and outer side of the cornea, and the other eye a similar condition, but on the outer side of the cornea alone. Histological examination showed the unusual appearance as due to local thinning of the sclera, thereby allowing the dark colour of the uvea to be perceived through the attenuated parts.

In a modest communication published in 1900 Arthur Eddowes[4] first drew attention to the connection between "blue sclerotics and brittle bones." He had seen a little lad with very dark sclerotics, who during the two years he remained under observation, had been affected with no fewer than nine independent fractures, not to mention a slight greenstick fracture of the tibia, which the child's mother treated herself by binding the limb at the seat of the fracture with a necktie. A history of a similar kind was obtained by Eddowes from a girl who possessed remarkably dark sclerotics. She had broken a bone on one occasion by merely falling on the bed. The patient stated that her father's eyes were like hers, and that he also had broken his bones several times, only recently sustaining a fracture of the arm whilst putting his coat on.

Eddowes, then, was the first not only to point to the connection between "blue sclerotics" and fragility of the bones, but also to the hereditary nature of the scleral condition.

The tendency to spontaneous fracture has been widely confirmed since it was mentioned by Eddowes. The assigned cause is often ludicrously insufficient to fracture anything like a healthy bone. One of Burrows' patients[14] broke the femur by sitting down suddenly on the nursery floor, and another fractured the tibia by missing the last step on the stairs. Mention has already been made of Eddowes' patients, of whom one fractured a bone by falling on a bed, and the other broke his arm by putting on his coat. In a girl, aged twelve years, whose case is reported by Conlon,[17] the left hip was broken and dislocated by a fall from a height of ten or twelve inches, and on another occasion her right leg was broken by a fall caused by a dog jumping on her. In Poynton's case[19] the left tibia and fibula were broken by a blow from a child's fist. In the family described by Peters[16] the father had broken his right leg on two occasions, first, when ten years of age, by falling over a stick, and later by a simple fall, while later still he fractured his left forearm by his head striking his arm as he slipped upon a smooth surface. His second son, when four years of age, broke his left leg by falling from a bench which stood in the porch of the house. Eight years afterwards the same lad broke his forearm by being tripped up and falling flat upon his stomach. At the moment when Peters wrote, another son was in hospital from a leg fractured from some unknown cause. Speaking of a girl included in the pedigree published by me[10] in 1910, the mother said "she had got quite used to picking her up broken" after a slight fall.

In Eddowes' case there were ten fractures during a period of two years. In a case reported by M. Ostheimer[21] there had been nine fractures between the age of one-and-a-half and four years, the child breaking the left femur five times, the right femur four times, and the left humerus once.

The fragility of the bones applies only to such members of the families as have actually inherited the "blue sclerotics," a point upon which H. Burrows[14] has dwelt.

F. A. Conlon[17], has found by means of X-rays that the long bones in his patients had a much enlarged medullary canal and a very clearly defined cortex. All the bones, indeed, showed lack of density and marked atrophy.

In 1908, A. Peters[7], of Rostock, reported instances of "blue sclerotics" in four generations of one family. The appearance of the eyes was attributed by him to congenital thinning of the sclera. In 1910, the present writer[10] described the condition in 21 out of 32 members belonging to four generations of one family; and, shortly after, N. Bishop Harman[11] added another generation to the same family, so that a total of over 55 individuals was recorded, of whom 31 were the subject of "blue sclerotics." In this extensive pedigree females were mainly affected—82 per cent. as against 44 per cent. of the males.

Other cases illustrating the hereditary nature of "blue sclerotics" were published in 1911 by J. D. Rolleston[13] and H. Burrows,[14] in 1912 by C. A Adair-Dighton,[15] in 1913 by F. A. Conlon,[17] and in 1914 by E. A. Cockayne[20] and M. Ostheimer[21] respectively. Transmission of the scleral peculiarity, as shown by examination of the pedigrees, seems to occur only through the affected members, generally females. Transmission to males through unaffected females does not take place. Briefly, "blue sclerotics" are the result of what Bateson has called "the knight's move" in heredity (Conlon).

Behr,[18] who reported a case of conical cornea in association with "blue sclerotics", drew attention to the dislocations to which the patient was habitually subject. E. A. Cockayne[20] noted the liability to sprains, and in explanation thereof suggested that all the fibrous structures around the joints were unduly weak and thin in these cases. He also commented upon the small *physique* of the patients, a point previously mentioned by Harman and noted by myself.

The congenital opacity of the cornea known as embryontoxon has been observed in cases of "blue sclerotics" by Peters,[7] Harman,[11] Conlon,[17] and myself.[10] In some of the writer's cases, as in Harman's, Fuchs' coloboma has been present.

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12. **Buchanan, L.**—The Ophthalmoscope, September, 1910, p. 685.
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1913. 16. **Peters, A.**—*Klin. Monatsbl. f. Augenheilk.*, May, 1913, p. 594.
17. **Conlon, F. A.**—*Boston Med. and Surg. Journal*, July, 3rd, 1913, p. 16.
18. **Behr.**—*Klin. Monatsbl. f. Augenheilk.*, September, 1913, p. 281.
19. **Poynton, F. J.**—*Royal Society of Medicine*; Section for the Study of Disease in Children, November 28th, 1913.
1914. 20. **Cockayne, E. A.**—The Ophthalmoscope, May, 1914, p. 271.
21. **Ostheimer, M.**—*Journ. Amer. Med. Assocn.*, December 5th, 1914.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—THE CORNEA.

1.—Degenerations.

(1) Meyerhof.—A case of familial degeneration of the cornea. (Présentation d'un cas de dégénerescence tachetée familiale de la cornée.) *Bull. de la Soc. d'Ophtal. d'Egypte*, 1911, p. 9.

(2) Marmoiton, E.—Marginal sclerosis of the cornea in the adult. (Sclérose marginale de la cornée chez l'adulte.) *La Clinique Ophtalmologique*, 10 novembre, 1911.

(3) Reber, Wendell.—A case of hyaline degeneration of the cornea. *Ophthalmic Record*, December, 1911.

(4) Roy, Dunbar (Atlanta, Georgia).—Report of six cases of degeneration of the cornea in the same family (nodular keratitis). *Trans. Amer. Ophth. Society*, Vol. XIII, Part i, 1912.

(5) Akatsuka, T.—A case of band-shaped corneal opacity resulting from an old corneal cicatrix. (Ueber einen Fall von gürtelförmiger Hornhauttrübung im Anschluss an eine alte Hornhautnarbe.) *Klin. Monatsbl. f. Augenheilkunde*, November, 1912.

(6) Reese, Robert G.—Dystrophia epithelialis corneæ. *Ophthalmic Record*, March, 1913.

(7) Stephenson, Sydney.—Striate clearing of corneal cicatrices. *Transactions Ophthalmological Society U.K.*, Vol. XXXIII, 1913.

(8) Wray, Charles.—Annular opacity of cornea with curious and movable vascular formation between annulus and limbus; both eyes affected equally. *Transactions Ophthalmological Society U.K.*, Vol. XXXIII, 1913.

(9) **Worton, A. S.—Calcareous degeneration in old corneal opacity.** *Transactions Ophthalmological Society U.K.*, Vol. XXXIII, 1913.

(10) **Muszyúski.—Cholesterin crystals in the cornea. (Cholesterin-Krystalle in der Hornhaut.)** *Centralbl. f. prak. Augenheilkunde*, October, 1913.

(11) **Lacompte, Frans.—Eight cases of congenital corneal opacities. (Huit cas d'opacités cornéens congénitales.)** *Ann. d'Oculistique*, décembre, 1913.

(12) **Romiée.—Calcareous keratitis.** *Société Belge d'Ophtalmologie*, 26 mai, 1914.

(13) **A. C. Hudson.—A note on certain peculiar pigmentary markings in the cornea.** *Royal London Ophthalmic Hospital Reports*, Vol. XVIII, Part ii.

(1) **Meyerhof**, of Cairo, relates the case of a male patient, aged 37 years who, together with his elder sister, aged 39 years, suffered from family degeneration of both corneæ. In the man's case the corneal opacities were first observed towards the age of eleven years. When the patient was first examined by Meyerhof, V. (corrected) was: R.E. = 5/25, and L.E. = 5/15. But in the course of about four years, during which he remained under observation, V. was reduced to: R.E. = fingers at 2 metres, and L.E. = 5/30. The opacities, which appear to have been of the reticular type, lay beneath Bowman's membrane, and microscopic examination of particles, removed by the operation of abrasion, revealed only the presence of hyaline material.

SYDNEY STEPHENSON.

(2) **Marmoiton**, of Nancy, briefly reports a condition exactly comparable with the arcus senilis, which he observed in a young man. There has been no antecedent inflammation. SYDNEY STEPHENSON.

(3) **Reber**, of Philadelphia, records a case of hyaline degeneration of the cornea in the case of a lady, aged 50 years, who noticed the peculiar looking milky-white spot spread over the upper part of the right eye and barely showing below the lower edge of the upper lid, the morning after she had received a foreign body in her eye. She was a healthy woman, and beyond having had attacks of cervical and submaxillary adenitis, there was no history of previous illnesses, except childish complaints. The infiltrate in the upper part of the right cornea measured 5 mm. x 7 mm., and was of the colour of old ivory or pale mutton fat. It was smoothly and regularly covered with corneal epithelium (Placido's disc showed no distortion). It appeared faintly lobulated in the middle, and the lower edge was finely crenated, almost feathery. A few fine conjunctival vessels invaded the mass from above, but otherwise the eye was quiet and normal, and the rest of the cornea was clear. R.V. = 5/15, L.V. = 5/12.

During the four years she was under observation, the condition remained almost stationary. She was given ascending doses of sodium iodide for a time and thyroid extract was also tried, but to no advantage. J. JAMESON EVANS.

(4) In **Roy's** family with degenerative corneæ the mother, two female and three male children were affected. A distinctive point about this variety of corneal affection is that it is never associated with any inflammatory symptoms. In this family, none of them had suffered from inflammation as part of the eye condition, but there was dimness of vision. The condition was more pronounced in the mother, but barely perceptible in the youngest child. The females showed a more marked involvement of the cornea than

the males, and hyperopia was common to all. Tuberculosis was excluded in this family as a cause of the condition. All were healthy. Roy considers its nature to be that of a hyaline degeneration. The mother was treated with atropin, dionine, yellow salve, calomel powder, cautery, etc., but without success. The opacities in her case seemed to project slightly above the surface, so that one could lift up the edges, but it was only with great difficulty that the whole opaque particle could be removed, and even then the surface left was indented and opaque. The scrapings were examined and no micro-organisms found ; the specimen showed more of a hyaline degeneration.

It is possible that climate has an influence in the production of the condition, since thirty-four of these cases have been met with at the Tübingen clinic. E. P.

(5) **Akatsuka,** of Osaka, describes a case in which an opacity having the characteristics of "band-shaped keratitis" developed round the cicatrix resulting from a perforating wound of the cornea made with a needle.

A. J. BALLANTYNE.

(6) The case of dystrophy by **Reese,** of New York, was in a woman, 74 years of age, who had complained of progressive impairment of vision for four years. R.V. 10/200, L.V. 15/200. Ocular tension with Schiötz tonometer—R : 18 mm. Hg. L : 25 mm. Hg. Partial anæsthesia of the corneæ ; no ciliary injection ; A.C. normal depth ; pupils normal ; lenses sclerosed ; no gross lesion of fundus apparent.

Both corneæ showed "diffuse, irregular greyish opacities with serrated borders and confined to the lower-inner quadrant, but not extending to the limbus, and more dense in front of the pupil without presenting a raised line in the horizontal meridian, as in the cases described by Fuchs. With the *loupe*, could be seen distinct, minute vesicles of uniform size, evidently occupying the epithelial layer and appearing as little black spots against the pupil. The epithelium had a wrinkled œdematous appearance over the opacity, with no denudation, and the parenchyma showed horizontal striæ."

Treatment consisted of dionin, holocain, and massage locally, and glycerophosphates internally. There was appreciable improvement at the end of four months.

The author reviews the theories of the pathogenesis of this disease and also its clinical and histological characters. J. JAMESON EVANS.

(7) **Stephenson,** of London, remarks on the beautiful striate or fern-like appearances presented by the clearing opacities in the corneæ of a patient who had had interstitial keratitis. An illustration accompanies the description of the case. The condition evidently belongs to the group described by E. Fuchs in *Beiträge zur Augenheilkunde*, Vol. II, 1895, p. 1.

ERNEST THOMSON.

(8) **Wray,** of London, reports as follows :—"Each cornea presents what at a distance looks like an arcus senilis, occurring much further from the limbus than is usual. This pseudo-arcus is elliptical in shape, with the long diameter horizontal, and is made up of very fine deeply-seated opaque dots, but in this area there does not seem to be a trace of any form of vascular formation. The centre and adjoining parts of the cornea are quite clear. The entire area between the arcus and the limbus is occupied by a hazy zone, 2-2.5 mm. wide. This is seen to contain parallel blood capillaries, which are traceable quite to the edge of the arcus. Examination with a pencil or by pushing the lids against it shows it is freely movable, doubtless on the surface of Bowman's membrane." The patient was a woman, aged 24 years.

ERNEST THOMSON.

(9) In a case of old-standing corneal opacity, in which by means of the corneal microscope a crystalline structure could be made out, **Worton**, of London, proposed to tattoo the *plaque*.

In the discussion **Mackay**, of Edinburgh, stated that he had seen a similar case in which he had given the opinion that the crystals might be cholesterin. Under the influence of a 1 per cent. solution of chloroform water as a lotion, used for months, there was a complete clearing up of the crystalline appearance, although some faint gray opacity remained. ERNEST THOMSON.

(10) **Muszyúski**, of Vienna, records a case of deposit of cholesterin crystals in the cornea. It occurred in a woman, aged 80, who had suffered for two or three years from a kerato-iritis of the right eye. The cornea became quite opaque and degenerate-looking, and the cholesterin crystals were seen in the lateral portions in the region of the palpebral fissure. The source of these crystals must be sought in fatty degeneration of the corneal tissue and in the products of the inflammatory process.

A. LEVY.

(11) Cases of congenital opacity of the cornea are very rare, and only seven have been seen in Fuchs' clinic in Vienna during 26 years. **Lacompte**, of Gand (by permission of Professor Fuchs), gives histories of these cases, one of which he had an opportunity of studying himself, and adds the notes of an eighth case from his own practice. The value of the communication depends on the descriptions of the conditions found, which should be read in the original by those interested in the subject. R. J. COULTER.

(12) **Romiée** has met with several cases of calcareous keratitis, characterised by the formation of prominent opaque *plaques*, having a greyish tint and brownish reflex, occupying the transverse diameter of the cornea. The affection is bilateral. These *plaques* are formed of corneal epithelial tissue, containing calcified granulations. Treatment consists in abrasion of the *plaque* without damaging the cornea. MARCEL DANIS.

(13) **Hudson**, of London, has noticed in some cataract patients a horizontal brown line situated at the junction of the middle and lower thirds of the cornea and at a slight depth from the surface. Similar lines have also been seen in conical cornea—in one case a brown circle. Is it the result of hyaline degeneration, or a blood pigment derivative? A. H. PAYAN DAWNAY.

2.—Inflammatory Affections.

(1) Brown, Samuel Horton.—Marginal ring ulcer of the cornea. *Ophthalmology*, January, 1911

(2) Frenkel.—Serpiginous ulcer of the cornea with irido-cyclitis. (Ulcère serpigineux de la cornée avec irido-cyclite.) *L'Ophtalmologie Provinciale*, mars, 1912.

(3) Spicer, W. T. Holmes.—Flame-shaped marginal epithelial keratitis. *Transactions Ophthalmological Society U. K.*, 1912.

(4) Westhoff, C. H. A.—Keratitis punctata tropica. *Centralbl. f. prak. Augenheilkunde*, Oktober, 1912.

(5) **Lacompte, Franz.**—A case of syphilitic parenchymatous keratitis after the linear extraction of cataract. (Un cas de kératite parenchymateuse hérédo-syphilitique après extraction linéaire de la cataracte.) *Annales et Bulletin de la Société de Médecine de Gand*, novembre, 1912.

(6) **Cantonnet, A.**—Circular and central hæmatic infiltration of the cornea. (Infiltration hématique circulaire et centrale de la cornée. *Bull. de la Société d'Ophtalmologie de Paris*, avril, 1913.

(7) **Wray, Charles.**—Late Stage of keratitis disciformis. *Transactions Ophthalmological Society U.K.*, Vol. XXXIII, 1913.

(8) **Streiff, J.**—On varying fine punctate opacities of the corneal epithelium. (Ueber wechselnde feinpunktierte Epitheltrübungen der Hornhaut.) *Klin. Monatsbl. f. Augenheilkunde*, September, 1913.

(9) **A. v. Szily, jun.**—On recurrent epithelial erosions following changes in the endothelium, and upon epithelial striæ in the cornea. (Ueber residivierende Epithelerosion infolge von Endothelveränderungen und ueber Epithelstreifen in der Kornea.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1913.

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(11) **Fernandez, Juan Santos.**—Interstitial keratitis in ophthalmic practice. *Ophthalmology*, January, 1914.

(12) **Alt, Adolf.** — A case of unilateral interstitial keratitis due to parotitis. *American Journal of Ophthalmology*, January, 1914.

(13) **Hardy, Wm. F.**—Parenchymatous keratitis in hereditary lues. *American Journal of Ophthalmology*, November, 1914.

(1) The symptoms in **Brown's** case had existed for four weeks before it came under the author's treatment. The left eye showed opacity of the outer half of the cornea, of unknown origin, and a crescentic marginal ulcer. The pupil was small, and the iris bound down by posterior synechiæ. Ophthalmoscopic examination was rendered impossible by the corneal opacity. Vision of the affected eye was fingers at six inches. Under treatment with boric lotion, iodoform ointment, and bandaging, the ulcer healed and became vascularised. The ultimate visual result was light perception. No organisms were found in the ulcer, and there was a suspicion that it was a rodent ulcer, but this idea was dispelled by the subsequent course of the case. A. J. BALLANTYNE.

(2) In a clinical lecture on the above subject, **Frenkel**, of Toulouse, discusses the case of a woman, aged 47 years. He points out the importance of inspection from a distance before palpation. He shows that the absence of severe objective symptoms is apt to be misleading, the diminution of the palpebral aperture is due to a slight degree or an early stage of blepharospasm, while the enophthalmos is due to an inhibition of the ocular sympathetic. Examination of the lacrymal apparatus should be made. Closer inspection of the eyeball will show an active congestion. The discoloration of the conjunctiva is not produced by venous stasis, nor is the chemosis due to this cause, but to an inflammation of the anterior part of the uveal tract. The author discusses at some length his reasons for coming to this conclusion.

Examination of the cornea discloses the origin of the trouble, oblique illumination shows a cloudiness of the anterior chamber, it is also seen that the ulcer presents a central infiltrated zone, surrounded by a less infiltrated area. The iris is muddy, and its surface markings are indistinct. The pupil is only partially dilated and is irregular. It is difficult to make out the fundus details. The vision is greatly reduced. Palpation causes pain and the tension is reduced ; these two symptoms point to cyclitis, which is directly due to the ulcer of the cornea. The author discusses the relation between the two conditions. With regard to treatment, he suggests the galvano-cautery and autosero-therapy. Whatever method of treatment is followed, the instillation of atropine should not be neglected. P. A. HARRY.

(3) In this case, by **Spicer**, of London, a cook, aged 26 years, always got inflamed eyes when at work and recovered when on holiday. Angular conjunctivitis was present. There was slight punctate staining of the lower part of the cornea only. On magnification, there was a number of superficial, grey, slightly-raised, pointed fingers or flames, starting with the base at the limbus and reaching more than a third of the way across the cornea ; some of these were split at their bases or in the whole length. There was no staining of the "flames" as a whole. At one time there were several small epithelial filaments starting from the affected area. There was no iritis. Wassermann reaction positive, but not considered to have anything to do with the disease. Hæmoglobin 100 per cent. and red cells 4,500,000. Zinc sulphate and dionine did some good, but the only permanent relief was obtained by rest from work.

In the discussion **Nettleship,** of London, said he did not remember anything similar in the human subject, but he believed there were some dogs, known as "fire-gazers," which were liable to get the cornea encroached upon by black pigment. ERNEST THOMSON.

(4) **Westhoff** has observed many cases of a special form of superficial and deep keratitis in Java, resembling somewhat in appearance the keratitis punctata superficialis described by Fuchs. The points of difference are the gradual onset of the tropical form, the involvement of the deeper corneal layers as well as the superficial, and the comparatively quick recovery—three to four weeks. It occurs epidemically and is due to the entrance into the eye of the contaminated water from the sodden rice fields.

Lt.-Col. H. Herbert has reported a similar condition from India, and has found in the cornea a bacillus resembling in appearance the Friedländer pneumo-bacillus, but differing from it tinctorially and culturally. This organism is apparently the cause of this tropical form of keratitis punctata superficialis. A. H. LEVY.

(5) **Lacompte** saw in a girl of fifteen years, three days after the extraction of cataract, the beginning of an interstitial keratitis. The author believes, with Antonelli, that the microbic or toxic localization in the cornea is favoured by the reduction of resistance brought about in the tissue by the traumatic lesion. MARCEL DANIS.

(6) The case narrated by **Cantonnet**, of Paris, is briefly as follows :—

A male patient, aged twenty-nine years, was affected with syphilis in February, 1912, and developed iritis of the right eye in the July following. On September 25, the iritis being then almost well, he was hit upon the eye with a piece of bread. Hyphæma was the result, and two days later, a violent irido-cyclitis was present in the injured eye. Hypotension was speedily succeeded by hypertension, and three or four days after the injury, the anterior chamber was completely filled with blood. About a fortnight afterwards, the periphery of the cornea (1·5 mm.) became transparent, the other parts remaining of a violet-red hue. Six weeks after the injury, 3 mm. of the margin of the cornea was transparent, but the central zone, which was limited by a perfectly circular and clearly-cut line, had assumed a non-transparent deep ochre shade very different from its former colour. Tension remained very low. Six months after the traumatism, the eye was slightly atrophic, extremely soft, and devoid of sight. The iris was adherent to the cataractous lens. The cornea presented at its centre a brownish circle, having a diameter of about 10 mm. It was separated by a perfectly circular line from the peripheral parts. Sensibility was lost over the centre and was feeble towards the periphery of this infiltration.

Cantonnet mentions an analogous case in a child of thirteen years, who was shown by Duverger at the Paris Ophthalmological Society on January 12th, 1909.

Cantonnet's case was evidently an instance of blood staining of the cornea, the peripheral clearing of which is very characteristic, and which is due to the gradual absorption of the blood pigment diffused through the substantia propria. SYDNEY STEPHENSON.

(7) The patient shown by **Wray**, of London, had previously been exhibited in January, 1912, when he presented a typical keratitis disciformis. By May, 1912, the characteristic deep-gray border had almost gone. At the present time the opacity is still dense. Traces of the characteristic gray edge may still be seen, but as the edge has changed, concentric lines have appeared as in the case figured in Fuchs' text-book, only the lines in this patient are much less marked. The author remarks that the case raises the question, are the concentric lines merely a feature of the later stage of the disease. ERNEST THOMSON.

(8) The two cases described by **Streiff**, of Genoa, presented moderate conjunctival hyperæmia and a corresponding degree of discomfort. On careful examination, a small group of fine, dark-grey, discrete spots was found in the cornea, apparently situated in the epithelial layers, and not giving rise to either elevation or depression of the surface. The spots changed in number and in distribution from day to day. There was slight loss of corneal sensibility. In one of the cases the condition disappeared after the discovery and removal of a very fine cilium which was in contact with the eye; in the other case, menorrhagia seemed to be the only possible cause. The author thinks that the changes are comparable with those described by Stern and Löhlein, and attributed by these authors to disturbance of the terminations of the fifth nerve. As their transient character suggests the exanthems of urticaria and œdema fugax, he suggests the name "Kerato-exanthema micropunctatum." A. J. BALLANTYNE.

(9) **A. v. Szily, jun.**, of Freiburg-im-Breisgau, first draws attention to Leber's work upon the œdematous conditions of the cornea which follow lesions of the endothelium, and mentions Erdmann's experiments upon the production of bullous keratitis in guinea pigs by the action of dimethyl sulphate. This condition was invariably associated with serous infiltration and swelling of the substantia propria. The cause can always be traced to a dropsical degeneration and loosening of the endothelium. Peters has described the case of a woman in whom bullæ developed as a sequence to striæ in the cornea following a difficult cataract extraction. At a later date these reappeared, and the whole epithelium was easily detachable. It was discovered that the endothelium was profoundly modified. A permanent opacity remained. The author himself saw a similar case at Freiburg. Recurrent erosion of the cornea followed an extraction, and eventually the eye was enucleated. The case was one of heterochromic cyclitis associated,

as usual, with cataract and glaucoma. Changes were found in the endothelium and Descemet's membrane. In another case the same condition followed an operation for dislocated lens. When the eye was examined microscopically, it was found that the nuclei of the endothelial cells had extruded chromatin, a phenomenon which Hertwig considers to be evidence of a disturbed nuclear plasma relation. v. Szily suggests the term "disjunctio epethelii" for this painful affection. The usual cause is a lesion of the endothelium.

v. Szily also described to the Congress a new corneal disease, illustrated by a plate. It is characterised by the presence in the corneal epithelium of fine grey dots and striæ. The affected region stains faintly with fluorescein. The condition was very chronic, but there was never any definite erosion or loosening of the epithelium. The disease is compared with "flame-shaped marginal epithelial keratitis," described by Holmes Spicer (for abstract see No. 3 above). T. HARRISON BUTLER.

(10) **Verderame** insists particularly upon the variability of the evolution of keratomycosis, of which the clinical forms may be more or less grave, for reasons both complex and ill-understood. The results of experimental inoculation in animals are not always applicable to those which take place in man, and Markow has thus shown that a certain strain of aspergillus may manifest a very pathogenic action upon the human cornea, while showing itself quite inactive upon that of laboratory animals. In mild cases the cure of keratomycosis aspergillina usually takes place spontaneously, or by the treatment ordinarily applied to ulcerations of the cornea. In grave cases, on the contrary, the keratitis takes the form of atypical hypopyon, but we must abstain from all hasty intervention, as corneal section or the cautery, which may entail irreparable lesions, while the regressive phase of the process may speedily come about and end in cure with comparatively slight changes of the cornea. A. ANTONELLI.

(11) **Fernandez**, of Havana, traces the history of opinion as to the ætiology of interstitial keratitis, and finds that the modern view, supported by the Wassermann reaction and other diagnostic methods, is that from 80 to 90 per cent. of the cases are of syphilitic origin.

Of the many methods of treatment which have been employed, the author favours the use of calomel by the mouth in fractional doses, local applications of duboisine, yellow oxide ointment, hot compresses and vapour douches, tonics and iodides. Salvarsan is not employed as a substitute for the mercurials, but only in cases where these fail. The treatment is continued for some time after apparent cure or establishment of a negative response to the Wassermann test. Fernandez has had a much larger experience of interstitial keratitis in persons between the ages of 30 and 40 than is shown by the statistics of other observers. A. J. BALLANTYNE.

(12) **Alt**, of St. Louis, reports the case of a man, aged 32 years, who, after an attacks of mumps, developed severe interstitial keratitis in one eye. Vision was reduced to hand movements. Under the influence of hot applications, atropin and dionin locally, and bichloride of mercury internally, the inflammatory symptoms rapidly subsided. A month after the patient was first seen by Alt, the cornea was perfectly clear and vision normal.

Alt has found only three other cases in the literature. These are by Charles (*American Journal of Ophthalmology*, July, 1906), by Worthington (*Ophthalmology*, April, 1913), and a case in *Beiträge zur Augenheilkunde*, Heft iv, S. 58 referred to in Michel's *Jahresbericht*, 1894.

Other diseases of the eye which have been reported as caused by mumps are neuro-retinitis, retrobulbar neuritis, optic atrophy, iritis, dacryo-adenitis, paralysis of accommodation, and paralysis of the extra-ocular muscles.

ERNEST THOMSON.

(13) The case reported by **Hardy**, of St. Louis, is one of those in which, while absolute proof is almost impossible of attainment, the probability of acquired syphilis being the cause of typical bilateral keratitis, as seen in hereditary lues, is extremely great. The patient was a youth of 17 years, and therefore well within the age at which hereditary lues is to be expected as the cause of such keratitis. The keratitis, however, followed on a definite infection and secondary symptoms. The author's final paragraph is that "if we admit in such instances the possibility of the keratitis being due to a previous hereditary taint, then it will be necessary to revise all our theories concerning parenchymatous keratitis and the curability and transmissibility of syphilis."

ERNEST THOMSON.

3.—Neoplasms.

(1) **Piccaluga, S. F.—Papilloma of the cornea. (Ueber das Papilloma der Kornea.)** *Klin. Monatsbl. f. Augenheilkunde*, Juli, 1913.

(2) **Dean, L. W.—Report of a case of primary sarcoma of the cornea.** *Annals of Ophthalmology*, October, 1913.

(1) **Piccaluga**, of Turin, describes a case in a man over 60 years of age, who had a small papillary growth removed from the limbus. It recurred five years later, was removed, and again made its appearance after three months. The eye was enucleated. At this time there was an epithelioma on one cheek, and a senile keratosis, believed to be "precancerous," on the other. During the enucleation, another tumour was discovered behind the caruncle. The limbal tumour was made up of a small connective tissue foundation covered with papillæ mainly composed of epithelium. The connective tissue was seen to be breaking through Bowman's membrane, and penetrating into the substance of the cornea. The author discusses the question as to whether the growth originated in the epithelium or in the connective tissue. At the growing edge of the tumour, he found the connective tissue portion pushing along between Bowman's membrane and the, as yet, unaltered, epithelium, and he believes that the growth is initiated by the connective tissue and then affects the epithelium. The picture suggests that in removing such tumours a wider margin should be left, so as to enclose the advancing edge, which presents no macroscopic change.

A. J. BALLANTYNE.

(2) **Dean,** of Iowa City, records the case of a white woman, aged 63 years, with a malignant tumour growing from and confined to the cornea. Examination showed it to be a spindle-celled sarcoma. The origin of the growth is believed to have been from the superficial layers of the substantia propria.

R. H. ELLIOT.

4.—Injuries.

(1) **Coburn, Edward B.—Leech bite of the cornea.** *Ophthalmic Record*, May, 1911.

(2) **Dalmer, Max.—On a case of pseudo-keratoconus. (Ueber ein Fall von Pseudo-keratoconus.)** *Zeitschrift für Augenheilkunde*, January, 1913.

(3) **Bywater, H. Hayward.—Note on a case of acetylene burn of the cornea.** *Lancet*, November 28th, 1914.

(1) **Coburn**, of New York, records the case of a Russian Jew whose right cornea showed a dense crater-shaped leucoma involving all except the outer portion of the cornea, the result of a leech bite. Presumably the leech was applied to cause injury to the eye, so that military duty might be avoided.

J. JAMESON EVANS.

(2) **Dalmer**, of Giessen, describes a case in which a blow caused a rupture of the membrane of Descemet. After a while, a localised conical swelling of the cornea, which the author calls a "pseudo-keratoconus," made its appearance. Treatment with eserine and a pressure bandage caused the elevation to disappear. Something of the same sort occurs when the membrane of Descemet is experimentally wounded in rabbits.

T. HARRISON BUTLER.

(3) The case reported by **Bywater,** of Liverpool, is that of a motor driver who was examining the outlet of an acetylene generator with the aid of a lighted match. For his pains he sustained burns of the lashes and brows and a burn of one cornea.

S. E.

5.—Miscellaneous.

(1) **Dutrow, Howard V.—Three cases of xerosis epithelialis with involvement of the cornea.** *Ophthalmic Record*, October, 1913.

(2) **Jacobi, Frank.—Guarded prognosis in injuries to the cornea.** *Ophthalmology*, October, 1912.

(3) **Pfalz.—On the duration and nature of the optical alterations in cicatricial corneal opacities. (Ueber Dauer und Art der optischen Veränderungen narbiger Hornhauttrübungen.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1912.

(1) **Dutrow,** of Ancon, describes three cases in which a chronic serpiginous ulceration of the cornea of the Mooren type was associated with xerosis of the conjunctiva, and from which the bacillus xerosis was isolated in pure culture. The author assumes that the bacillus xerosis became the pathogenic agent in the corneal ulceration after it had gained entrance to the corneal tissues through abrasions.

J. JAMESON EVANS.

(2) **Jacobi,** of Toledo, Ohio, discusses a number of corneal lesions in which a guarded prognosis is advisable. These include traumatic interstitial keratitis, which may be syphilitic; simple aseptic injuries which cause great reduction of vision on account of astigmatism; flap wounds, which are particularly apt to be infected; contusions of the cornea, which are likely to leave permanent visual loss; and burns with acids or caustic alkalies.

A. J. BALLANTYNE.

(3) **Pfalz**, of Düsseldorf, has for many years made a careful study of corneal opacities. His paper is illustrated by two plates which show the nature of the opacity, its age, the vision obtained, and the character of the alteration in

Placido's rings. Some of the drawings trace the improvements seen in cases during from nine to twelve years. Pfalz points out that the apparent density of the opacity, as seen by oblique illumination, is no indication of the functional disability. The opacity, as such, only absorbs light and enfeebles the retinal images. The sharpness of contour of the retinal picture depends entirely upon the condition of the corneal surface, and upon the extent of its irregularities. The keratoscopic picture is the best index of the functional power of any kind of corneal nebula. Traumatic nebulæ, in fact all cicatrical opacities, are very hopeful from an optical standpoint. Improvement may continue for twelve years. The irregular astigmatism caused by long-continued corneal disease of a dyscrasial type, especially the so-called scrofulous keratitis, tends permanently to reduce the optical function of the cornea. T. HARRISON BUTLER.

II.—INJURIES TO THE EYE BY GOLF BALLS.

(1) **Posey, William Campbell.—Eye injury following explosion of golf ball.** *College of Physicians of Philadelphia ; Section on Ophthalmology*, March 19th, 1914.

(2) **Elliot, R. H. and Inman, W. S.—Serious injury to an eye from a bursting golf ball.** *Brit. Med. Journal*, March, 20th, 1915.

(3) **Secretan, W. Bernard.—Bursting golf balls.** *Ibidem*, March 27th, 1915.

(4) **Weatherhead, E.—Bursting golf balls.** *Ibidem*, April 3rd, 1915, p. 622.

(1) **Posey**, of Philadelphia, relates the case of a child, two years of age, who seemed likely to lose the sight of the right eye from burn following the explosion of a golf ball, stated to be either the "Domino" or the "Baby Dimple Ball," manufactured by Spalding & Co. The injury resulted from the mother attempting to show the child the contents of the ball by biting into the core with her teeth. The explosion which followed emptied the contents of the ball into the child's eye and at the same time burned the mother's mouth badly.

Posey mentioned another case he had met with in his own practice, and incidentally referred to similar cases reported to the Section by Carpenter, Baer, and Langdon. SYDNEY STEPHENSON.

(2) Injuries to the eye from so-called "watercore" golf balls have been reported from America, and in England injury from a "zone zodiac" ball was published by W. H. H. Jessop in 1914 (for abstract see THE OPHTHALMOSCOPE, 1914, p. 621). The injury has never occurred whilst at play, but has always been caused by the balls being cut open, in order to ascertain the nature of their contents. In point of fact, the contents seem to vary considerably. In Jessop's case the core consisted of a semi-fluid mass of soft or potash soap, which was strongly alkaline ; in one of Lowell's cases the contents were a mixture of barium sulphate, soap, and a free alkali ; a paste of zinc chloride and soap was found by Wilder. Another report affirms the contents of the core to have been a mixture of chloride of lime and soap, and yet another names a solution of zinc chloride as the material.

Although the majority of the reports have come from America, and Jessop's case is the only one so far published in Great Britain, yet it is possible that the accident is not so uncommon as one might suppose in this country. The authors of the present communication have both heard reports of cases, of which they have been unable to obtain details. They quote Dr. H. Graveley, of Fletching, Uckfield, Sussex, however, as having actually seen such a case within two hours of the accident. Sight was then reduced to doubtful appreciation of light.

The case now brought forward by **Elliot**, of London, and **Inman,** of London and Portsmouth, was in a child of seven years, who was watching from a distance of two feet or so, a relative engaged in the operation of cutting open the core of an unknown make of golf ball. Some very irritating fluid was projected into the lad's eye by the sudden bursting of the core. With little delay, the conjunctival sac was well washed out, the child being at the time under the influence of a general anæsthetic. The cornea was deeply cauterised by the irritant fluid, and for some time it looked as if the sclera would perforate. The skin of the eyelids was scarcely affected, but the conjunctiva was excoriated by the caustic. About nineteen weeks after the accident, V.=p.l., extensive opacity of the cornea, and symblepharon.

The writers comment upon the several points that (1) the damage is of a serious nature; (2) a majority of the cases occur in children; and (3) that in two at least of the recorded cases the victim was a child watching the operations of some other person. SYDNEY STEPHENSON.

(3) **Secretan,** of Reading, saw a most severe conjunctivitis result from injury to an eye from the bursting of a "fluid core" golf ball, which the victim was busily engaged in dissecting. No permanent injury. The contents of the ball were strongly alkaline and of a soapy consistency.

SYDNEY STEPHENSON.

(4) **Weatherhead**, of Wolverhampton, has seen a case of injury to the eye from bursting of a golf ball, where "the front of the eyeball was completely disorganised." He speaks of having heard of two or three other instances. SYDNEY STEPHENSON.

III.—THE RUSSIAN CAMPAIGN AGAINST BLINDNESS.

Bellarminoff, Professor.—The campaign against blindness in Russia undertaken by the Empress Marie Alexandrovna Aid Association for the Blind. (Mesures prises contre la cécité en Russe par le Patronage de l'Impératrice Marie Alexandrovna pour les aveugles.) *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

The "Patronage," with the work of which this paper by **Bellarminoff** deals, was founded in 1881. During the first ten years of its existence its work was mainly directed towards the amelioration of the lot of the blind, including their education and the provision of Braille literature. About the year 1886 two new lines of activity were opened up, namely, the collection of statistics, and the organisation of measures for the prevention and treatment of eye diseases. The first statistical enquiries were not conducted by skilled investigators, but they disclosed [the existence in European Russia of

189,927 blind persons, *i.e.*, 20 per 10,000 of the population, or double that of the other European countries. Later, a number of physicians undertook the systematic investigation of whole localities, and of 171,266 persons examined in this way, those found to be blind in both eyes were in the proportion of 32 per 10,000. It is further stated that at that time there was one eye patient to every 112 of the population, and only one eye specialist to half a million inhabitants. The Society began to work, and is still working, hard to rectify this state of matters.

The author proceeds to deal at length with the work of the "mobile missions," which were instituted in 1893, and on which has been based the work of the travelling hospitals in Egypt. The objects aimed at were: to carry, so far as possible, special ophthalmic treatment to the populations of districts far removed from the large centres, to ascertain the exact amount of aid required in those districts, and to give to the physicians of the districts opportunities to complete or to refresh their knowledge of eye treatment. In the autumn of 1893 seven such missions were sent to different parts of Russia. In two months they carried out an enormous amount of useful work, and were received with gratitude by the districts served. The medical press of Russia was divided in its attitude to the work. While some papers were warmly favourable, others were as warmly hostile, but Bellarminoff believes that the following points were established, namely, that the populations in parts far removed from the large centres are in urgent need of ophthalmic aid, that this need cannot be satisfied by the overworked and non-specialist physicians of the districts, that among the patients attending the travelling hospitals are many curable blind, and that there is a considerable proportion of difficult and complicated cases and such as require operation. Many of the district physicians, after seeing and assisting in the work of the "missions", began themselves to undertake eye work.

In 1894 the number of "missions" was increased to twenty-one, and a proportionally large amount of work was done. Among the results was the setting up of permanent ophthalmic hospitals and a permanent ophthalmic service in some of the districts visited. Moreover, the travelling hospitals have given opportunities for some useful scientific work; they have had an educative value for the people and for the profession; and they have gained valuable information as to the extent of blindness and its causes in Russia. In the course of twenty years the stationary and permanent clinics for eye treatment have increased in number to 162, employing a medical staff of 160, and treating 237,000 patients per annum. Combining the work of the mobile "missions" and that of the stationary organisations, the activities of twenty years embrace three and a half million patients, 800,000 operations, and the registration of 94,000 blind persons. The funds required for this large work are obtained from various sources: subscriptions from members of the "Patronage," church collections, donations from the blind, the sale of objects made by the blind, aid from the municipalities, and interest on invested funds. In the course of twenty years the cost of treatment averages out at the low figure of one shilling and three pence *per* patient. Needless to say, most of the oculists, especially those of the permanent stations, are unpaid, and the low working cost is further made possible by material aid in the form of hospitality, heat, lighting, clothing, drugs, etc., from local municipalities and benevolent societies. A. J. BALLANTYNE.

IV.—HEMERALOPIA.

(1) **Oguchi, Ch.—On a peculiar hemeralopia with diffuse greyish-white discolouration of the fundus. (Ueber die eigenartige Hemeralopie mit diffuser weiss-graulicher Verfarbung des Augenhintergrundes.)** von Graefe's *Archiv f. Ophthalmologie*, LXXXI Band, Heft i, 13 February, 1912.

(2) **Hess, C.—Hemeralopia.** *Archives of Ophthalmology*, September, 1912.

(3) **Schmidt-Rimpler, H. — Glare and nyctalopia. (Blendung und Nyktalopie.)** *Klin. Monatsbl. f. Augenheilkunde*, Dezember, 1912.

(4) **Desiderio, Zani.—Retinitis punctata albescens. (Della cosiddetta retinite puntata albescente.)** *Annali di Ottalmologia*, Vol. XLI, fasc. 1-2, p. 66 to 75.

(1) Affections of the fundus which are closely connected with typical retinitis pigmentosa are: retinitis pigmentosa *sine pigmento*, atrophia retinæ et choroideæ gyrata (Fuchs), and retinitis punctata albescens, of which Lauber again distinguishes two types, the first being congenital and causing no visual trouble besides hemeralopia, while the second proceeds to degeneration of the pigment, optic atrophy, thinning of the retinal arteries, circumscribed choroidal atrophy, etc.

Oguchi, of Tokio, describes three cases of another type. The fundus here is of a diffused greyish-white colour and no separate white dots are discernible. The disc is normal, and the vessels appear very dark against the white background. The vision is generally good, but the hemeralopia is very marked, while the visual field is found contracted, if examined in subdued light.

R. GRUBER.

(2) **Hess,** of Munich, has examined twelve new hemeralopes since his last publication on this subject. He finds that (1) there is a distinct, sometimes a marked, diminution of sensibility to high light strengths in almost all examined. This is instanced in the cases of those who say that they are able to look at the sun better than most people, and that they can see only stars of greater light strength, *e.g.*, Venus and Jupiter, but cannot see others, even with a telescope; (2) there is a diminution of sensibility to red, both with spectrum red and that of a red glass; and (3) foveal vision is not normal. Hess has devised a special instrument for testing this, which he describes, and with this he finds that in one case foveal vision for red required six to eight times the illumination that he himself required, whilst for blue the multiple was 800. Hess does not consider that we know whether an imperfect formation of visual purple plays a part in hemeralopia.

ROSA FORD.

(3) It is a familiar fact that a picture hung on a narrow wall between two windows is difficult to see. A number of explanations have been offered to account for this. According to Fuchs, the imperfect transparency of the ocular media causes the bright light to be diffused all over the retina. Another explanation attributes the phenomenon to ultra-violet rays setting up fluorescence in the media and retina.

Schmidt-Rimpler, of Halle, says that the difficulty arises from a disproportion between the strength of illumination of the central and peripheral parts of the retina. He cites a number of familiar phenomena which illustrate the fact that when the periphery of the retina is illuminated to an undue degree, central vision is correspondingly imperfect. Thus, if the sun is near the horizon, distant objects near the sun are seen as if through a haze. In a picture gallery the pictures are more clearly seen if looked at through a tube, so as to cut off the excessive light from the periphery of the retina. Similarly, in reading, visual acuity is improved if the whole of the surface except the part which is being read is covered with a black screen.

The author states, further, that in many cases of optic nerve and choroidal disease central vision is influenced to an unusual degree by excessive peripheral illumination. In such cases the patients complain of glare or even of nyctalopia. This accounts, in his opinion, for the improved vision which is experienced in the dusk by persons with central scotoma.

A. J. BALLANTYNE.

(4) The two cases studied by **Desiderio,** of Venice, rather belong to the group punctate albinism of the fundus of the eye with congenital hemeralopia (Lauber) than to that of true punctate retinitis (Mooren). They were met with in a lad of twelve years and in a girl of six years, the offspring of the same father, who was very alcoholic and who had died from tuberculosis. The little girl, in addition to her eye troubles (V.=1/3, marked hemeralopia) showed considerable arrest in her mental development and suffered from frequent epileptic crises.

A. ANTONELLI.

OPHTHALMOLOGY AND GENERAL MEDICINE.

(*Fourth Notice.*)

(1) **West, Samuel.—Notes on diabetic retinitis.** *Lancet*, April 11th, 1914.

(2) **Moore, R. Foster.—Lipæmia retinalis.** *Lancet*, February 20th, 1915.

(1) **West,** of London, has failed to observe anything in the retinitis of diabetes by which the disease can be diagnosed in the way in which granular kidney can be diagnosed from the retinal changes. According to West, it is impossible to diagnose diabetes from anything that can be seen in the retina. Many cases of so-called "diabetic retinitis" are typically albuminuric, and are due to the association of diabetes with granular kidney. Apart from the degenerative form of retinitis (white glistening patches grouped around the yellow spot), which West holds as characteristic of granular kidney, whether associated with diabetes or not, the exudative form is in all cases of toxic origin, and might therefore arise in the course of diabetes, just as it does in the course of acute nephritis. There is nothing in the exudative form to distinguish it from the neuro-retinitis of other affections—*e.g.*, that which occurs with cerebral tumour, and it may occur with acute or chronic nephritis. What the poison is we know no more in diabetes than we do in nephritis.

ERNEST THOMSON.

(2) Two cases of this very rare condition are described by **Foster Moore,** of London.

The following is the description of the ophthalmoscopic appearances in the first case:—The abnormal features were almost entirely limited to the appearance of the retinal vessels. These were of a salmon colour on the disc and for a short distance beyond, but when traced towards the periphery, the colour became much less saturated, and gradually merged into a cream colour with almost no pink tinge. The colour of the arteries and veins did not differ at all. In the centre of the disc a faint central light streak was seen on the arteries, and by this means, but by no other, could the arteries be distinguished from the veins ; towards the periphery both sets of vessels were identical in appearance. Both arteries and veins were well filled, perhaps a little abnormally so, but there was no turgidity or obvious distension. The general tint of the fundus was rather pale. The optic disc was normal in appearance, its edges were perfectly sharp and clear-cut, and there were neither hæmorrhages nor exudates anywhere to be seen.

In the second case the appearances were similar, except that the vessels, both arteries and veins, were markedly distended and tortuous.

Lipæmia is described as occurring, the author says, in chronic alcoholism, phthisis, asphyxia, nephritis, phosphorus poisoning, pneumonia, peritonitis, gout, starvation, and diabetes. He has been unable to discover any reported case of lipæmia retinalis except associated with diabetes. Both the present cases were diabetics, and the retinal condition appeared shortly before death. The author discusses the cause of the peculiar appearance of the retinal vessels. He holds that this is not due to any chemico-physical change in the hæmoglobin, but to the opacity of the plasma. The fact is the retinal vessels come to resemble the *normal* choroidal vessels as seen with the ophthalmoscope. They become ribbon-like, lose the light streak, and appear pink. The reason the choroidal vessels have this appearance is that the light has to be transmitted from them through the retina. When the central axial stream of the retinal vessels is surrounded by a plasma which, on separating, has the appearance of cream, the effect of a ground-glass instead of a transparent envelope is produced. The great diffusion of light through this envelope results in the retinal vessels having an appearance similar to those of the choroid as seen through the retina.

Although it has been suggested by Heyl that there is a certain similarity between leukæmic retinitis and lipæmia retinalis, the author does not think they can be confused. The colour is different. In leukæmic retinitis there is distension of the veins more than of the arteries, and there are hæmorrhages.

Some other conclusions come to by Moore are as follow :

Lipæmia retinalis occurs in young diabetics who are usually bordering on coma, and it consequently implies an immediately grave prognosis, but recovery from the condition may occur. It implies a high degree of lipæmia, and it is probable that in no condition other than diabetes does lipæmia attain a sufficiently high degree to give rise to the appearances of lipæmia retinalis. Vision may remain unaffected in spite of a very high degree of lipæmia retinalis. The ophthalmoscopic picture of the condition is so striking and characteristic that it cannot be overlooked nor mistaken for any other condition.

The examination of the blood was undertaken by Dr. T. H. C. Shore, but as the findings do not seem to have been very definite in certain respects, it is better that this part of the article should be studied in the original.

ERNEST THOMSON.

VI.—DETACHMENTS OF RETINA, etc.

(1) **Gonin.—Isolated detachment of a retinal vessel, with two sketches. [Décollement isolé d'un vaisseau rétinen (avec deux croquis).]** *Ann. d'Oculistique*, janvier, 1912.

(2) **Pfalz, G.—Can idiopathic detachment of the retina result from physical exertion? (Kann idiopathische Netzhaut-ablösung durch körperliche Anstrengung entstehen?)** *Klin. Monatsbl. f. Augenheilkunde*, Dezember, 1913.

(3) **Hudson, A. C.—Notes from clinical demonstrations: Serous detachment of the choroid and ciliary body as an accompaniment of perforating lesions of the eyeball.** *Royal London Ophthalmic Hospital Reports*, January, 1914.

(4) **Levy, A.—Total detachment of the retina of a child.** *Transactions Ophthalmological Society U.K.*, 1914.

(1) **Gonin's** patient, a boy, aged 7 years, lost the sight of his left eye as a result of a blow from a stone. When seen three weeks later, there was a rupture of the choroid surrounding the disc except on the nasal side. The singular feature about the case was that a vessel, apparently a vein, had been torn in two at the edge of the optic disc, and the portion of its trunk which should have been situated between the seat of its rupture and the peripheral edge of the choroidal rupture was floating in the vitreous, where it assumed a variety of appearances according to the position which it occupied from time to time. During the following fortnight, the peripheral trunk of the vessel gradually disappeared, giving the impression that it underwent progressive atrophy.

The author has been able to find only one case in ophthalmic literature at all analogous to the one under notice. This was one recorded by Dunn, in 1896 (*Archives of Ophthalmology*, XXV, 1), in which following attacks of choroiditis, the inferior nasal artery became detached and projected into the vitreous. R. J. COULTER.

(2) **Pfalz**, of Düsseldorf, discusses this question from the point of view of the accident insurance expert. Speaking of the actual cases which have come under his notice with detachment of the retina alleged to have resulted from a specific physical strain, he points out that very often the patient at the first consultation has made no reference to an accident, and has even had no recollection of an unusual strain when questioned with regard to the possibility. Usually these patients, after days or weeks, begin to remember the occasion on which the vision failed from a strain; they evolve a history of sudden failure of vision, of flashes of light, and of pain. They are even able to produce witnesses who remember the event and the victim's complaints at the time.

In previous discussions of the subject a good deal of stress has been laid on the close time relationship between the unusual physical effort and the occurrence of the visual loss. Pfalz points out that even when detachment is known to be due to direct injury, it does not always develop at once. It may take weeks or even months to develop, the vision failing gradually, or central vision may be unaffected until the detachment has progressed to a considerable extent.

The general conclusions reached by Pfalz are that the assumption of an aetiological relationship between physical over-exertion and detachment is unwarranted; when the symptoms of displacement of the retina make themselves known to the patient about the time of some unusual bodily strain, we are not dealing with the onset of a fresh detachment, but with the encroachment on the field of vision of an already existing detachment ; and that this is not the result of the strain, but of the movement of the head and eye which accompanies it. The condition in question, therefore, cannot be looked upon as an accident. A. J. BALLANTYNE.

(3) **Hudson,** of London, describes a couple of cases where detachment of the choroid followed sclero-corneal trephining. He believes that serous detachment, in varying degree, occurs in all cases of perforating lesion of the eye involving escape of the aqueous humour. The systematic review of an extensive series of pathological preparations carried out by the author not only confirms the foregoing supposition, but leads him to conclude that it embraces all cases in which a considerable reduction of intra-ocular pressure is present.

The conclusions are as follows :—

1. That serous detachment of the choroid and ciliary body is the natural accompaniment of considerable reduction of the intra-ocular pressure, and that its occurrence is the rule in every case of sustained reduction of pressure.
2. That the degree of the detachment varies, more or less directly, as the degree of reduction of the intra-ocular pressure.
3. That the fluid responsible for the detachment is derived probably from the choroidal blood-vessels and not improbably from the veins.
4. That the reduction in intra-ocular pressure is the chief factor in the causation of detachment of the choroid and ciliary body in shrunken eyes ; whereas an increased intra-ocular pressure may suffice to counteract, completely or in part, the tendency of a cyclitic membrane to produce such detachment by traction. SYDNEY STEPHENSON.

(4) The cause of the detachment in the case reported by **Levy,** of London, was unknown. The patient was a boy, aged 12 years. The eye was not myopic, there was no history of direct injury, or of infective illness, and the detachment could everywhere be transilluminated. It is suggested that the condition might be due to thrombosis. ERNEST THOMSON.

VII.—OPERATIONS.

9.—Dacryocystitis.

(1) **Kühnt.—A note upon the technique of Toti's dacryocystorhinostomy. (Notiz zur Technik der Dacryocystorhinostomy von Toti.)** *Zeitschrift für Augenheilkunde*, April and May, 1914.

(2) **Whale, Harold.—Case of West's intranasal operation for dacryocystitis.** *Proceedings Royal Society of Medicine*, Vol. VII, July, 1914.

(3) **Polyak, L.—The treatment and direct operation for diseases of the tear sac from the nose (Intranasal dacryocystostomy). [Ueber die Behandlung und directe Operation der Tränensackerkrankungen von de Nase aus (Intranasale Dakryocystostomie).]** *Actes du XII Congrès International d' Ophtalmologie*, Petrograd, 1914.

(1) **Kühnt**, of Bonn, when performing Toti's operation in cases where the sac is not dilated and no ethmoidal cells are present in the lacrymal fossa, instead of cutting a window in the nasal mucous membrane and periosteum, turns back a flap, which he sutures to the nasal lip of the skin periosteum

incision. In the absence of a diagram it is difficult to grasp the exact details of this modification. Kühnt has already employed it seven times with satisfactory results. T. HARRISON BUTLER.

(2) **Whale**, of London, gave an account of the case-history of a patient operated on by West's method. The result was good.

In the discussion operative details were dealt with to a certain extent, and, in reply to a remark by **W. Lang**, of London, the operator admitted the possibility that the patient had now no excretory lacrymal apparatus of any sort, and was thus in the same condition as if she had been operated on by the external route, except that there was no scar.

ERNEST THOMSON.

(3) After considering the history of attempts at the intranasal treatment of lacrymal sac disease up to and including the earlier operative procedures of Polyak, West, and Toti, **Polyak**, of Budapest, proceeds to the description of his own most recent operation of intranasal dacryocystostomy. It is based on Toti's dacryocystorhinostomy. After anæsthetising the nasal mucous membrane with cocaine and administering a sub-periosteal injection of "Novocaine-Tonogen," he forms a mucous membrane flap on the lateral nasal wall in the middle meatus. This flap is folded back; the bony wall of the lacrymal groove (made up of superior maxilla and lacrymal bone) is removed with chisel and punch, until the whole nasal wall of the sac is exposed. The nasal wall of the sac is then removed, taking care to make the removal complete, and especially dealing with the part where the sac passes into the nasal duct, for here there is apt to be a small pocket in which septic material may lodge. After replacing the flap, the nasal fossa is tamponned for three or four days.

When the result after two months is satisfactory, it may be considered as permanent. In about 15 per cent. of cases complications occur in the shape of closure of the opening or synechiæ between the lateral wall and the septum. These can be rectified later by a slight operation. They occur within the first six weeks, and are due to delayed healing.

The results are good in all forms of dacryocystitis, but are best and most easily obtained where there is ectasia of the sac. The advantages of Polyak's operation over Toti's are said to be that it avoids an external cicatrix, that any failure can be put right by subsequent operation, that it can be employed in cases with suppuration in and around the sac, and that it is suitable for cases of tuberculosis of the nose and lacrymal sac in which the skin is not involved. The operation differs from West's in that it comprises the complete removal of the nasal wall of the sac and of the upper part of the nasal duct. A. J. BALLANTYNE.

10.—Corneal Ulcer.

(1) **Hudson, A. C.—Notes from clinical demonstrations. The surgical treatment of corneal ulcer and its complications, with special reference to operation for anterior synechia.** *Royal Lond. Ophthalmic Hospital Reports*, January, 1914.

(1) The chief object of this very practical communication on the surgical treatment of corneal ulcer by **Hudson**, of London, appears to be to describe a modification of Abadie's operation for anterior staphyloma.

SYDNEY STEPHENSON.

11.—Cataract.

(1) **Lint. van.—The operation of cataract with sliding of the conjunctiva. (A propos de l'opération de la cataracte avec glissement de la conjonctive.)** *La Presse Medicale Belge*, Vol. LXIV, p. 13.

(2) **Vacher, Louis and Denis, Maurice.—On conjunctival bridges, conjunctival flaps, corneal sutures, and van Lint's sutures in operations for cataract. (Pont conjonctival, suture de la cornée suture de van Lint, dans l'opération de la cataracte.)** *Ann. d'Oculistique*, juin, 1914.

(3) **Luedde, W. H.—Simple discission of lens capsule for cataract with complications.** *American Journal of Ophthalmology*, November, 1914.

(1) **van Lint**, of Brussels, insists upon the good results he has obtained from his method of operation for cataract (*see* THE OPHTHALMOSCOPE, October, 1912). Indeed, up to the present all the results have been excellent.

MARCEL DANIS.

(2) **Vacher** and **Denis**, of Orléans, consider that their method of extracting cataracts, leaving a bridge of conjunctiva undivided, gives better protection against the complications of the operation both immediate (inversion of the flap, prolapse of iris, incarceration of capsule, and loss of vitreous) and remote (panophthalmitis, iritis, glaucoma, and secondary cataract) than Desmarre's free conjunctival flap, Kalt's corneal suture, or van Lint's conjunctival suture. They have performed the operation 972 times, and now recommend it as a routine method, since after a little practice, it can be performed more easily than the other operations.

R. J. COULTER.

(3) **Luedde,** of St. Louis, relates and discusses somewhat discursively three cases in which "cataract with complications" in adults was treated by discission, and concludes his article with the remark that "with a small incision (in the capsule), repeated if necessary, we may look for the best results even in complicated cases." In the opinion of the reviewer, such cases can only be treated on the merits of each and any such general deduction as is drawn by the author on the basis of three cases is hardly justifiable. Of the three cases, regarded from the standpoint of general interest, the first seems of interest to all, not so much because it forms a good illustration of the author's contention, but because a complication arose as the result of the operation which eventually destroyed the sight by glaucoma. This complication was the doubling back of the iris at one part above, apparently due to the employment of too free a discission with resulting large swelling of the lens. The condition was not seen until, after a number of weeks under atropine, the lens matter had been sufficiently absorbed to allow the iris to be inspected. It was then found that the upper temporal quadrant of the iris did not return to its normal position, as did the remainder, when the use of mydriatics was stopped. The pupillary margin of the iris was tucked under, apparently folded back on itself. Myotics were without effect, although quite effectual on the other parts of the iris. The patient was warned that this was a somewhat serious complication, and an operation was suggested for its relief. This was refused, corrected V.A. being 16/19, and the other eye perfect. The patient was kept under bi-weekly observation for eight months, during which time there were no signs of glaucoma, while the sight remained unimpaired. At the end of the ninth month, central V.A. had fallen to 16/30 and tension was strongly *plus*. Operation was again refused. When she

again appeared after five months, the tension was high and the V.A. only equal to counting fingers. The eye was now blind, but myotics controlled the tension to an average of 60 mm. at which the patient was comfortable. The deformity of the iris remained unchanged. The iris sloped from the periphery towards the centre, like a funnel, without bulging.

The second case hardly calls for comment except that it was successful. The third case was one of cataract with posterior synechiæ and a small pupil. It also was successful after several needlings.

In spite of the opinion expressed by the reviewer, that the conclusion drawn by the author seems hardly justifiable, the latter is to be congratulated on the unqualified success of two out of three cases and the relative success of the remaining case. ERNEST THOMSON.

12.—Pterygium.

(1) **Cazalis, C. A.—The operative treatment of pterygium by the formation of a conjunctival hem at the corneal border. (Thérapeutique opératoire du ptérygion par la création d'un ourlet conjonctival, face à la cornée.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(1) **Cazalis**, of Béziers, dissects the pterygium from the cornea and globe, and curettes and cauterises the base. He then undermines the upper margin of the bulbar conjunctiva for a few millimetres, and converts this into a rectangular flap by an incision along the limbus and another parallel to this and passing up from the base of the pterygium. The corneal edge of this flap is then rolled in on itself and the flap brought down in such a way that this "hem" lies along the corneal border, while the other free edge is stitched to the lower cut edge of the bulbar conjunctiva. The two principal objects served by this operation are, that the cicatrix of the conjunctival wound is taken downwards away from the horizontal meridan of the eyeball, *i.e.*, from the axis of the pterygium, and that there is presented to the corneal margin an epithelial surface unlikely to be the source of the cellular proliferation which is one of the causes of recurrence.

A. J. BALLANTYNE.

13.—Extirpation of the Tarsus.

(1) **Dean, F. W.—Report of case; new operation for extirpation of tarsus of upper lid.** *Annals of Ophthalmology*, October, 1913.

(2) **Steiner, L.—The treatment of trachomatous entropion by extirpation of the tarsus. (Le traitement de l'entropion trachomateux par l'extirpation du tarse.)** *Ann. d'Oculistique*, mars, 1914.

(1) **Dean**, of Council Bluffs, reports a case in which he removed the tarsus from the skin surface, sparing the conjunctiva in so doing. The condition calling for interference was one of great thickening of the tarsal plates, causing ptosis. He claims that the operation is easy; that the conjunctiva can easily be spared; and that irritation, due to suture knot in the conjunctival sac, is avoided. R. H. ELLIOT.

(2) **Steiner**, of Sourabaya (Java), strongly recommends excision of the tarsus as the best treatment of trachomatous entropion. He has performed the operation more than two hundred times, and finds that it permanently corrects the position of the eyelashes, relapses being very rare, while it also removes the thickened tarsus and cicatricial conjunctiva, which are causes of irritation and complications. He describes his method of performing the operation, which is based on the precepts of Kuhnt and Straub.

R. J. COULTER.

14.—Removal of the Eye.

(1 **Bialetti, C.—Considerations on amputation of the anterior segment of the eyeball. (Considerazioni sull' amputazione del segmento anteriore del bulbo oculare.)** *Annali di Ottalmologia*, Vol. XLI, fasc. 3, p. 152 to 153.

(2) **Lister, W. T.—Removal of eyes in the presence of orbital cellulitis.** *Brit. Med. Journal*, March 6th, 1915.

(1) **Bialetti**, of Vigevano, believes that the sole advantage of amputation of the anterior segment of the eyeball is to render the prothesis more perfect. It is indicated when there is no sign of suppuration, neither hypotony nor atrophy, no ossification or intra-ocular foreign body, and no danger of sympathetic ophthalmia. Bialetti affirms that an artificial eye applied over the stump of an amputated eyeball is much more perfect than after evisceration or enucleation. As regards enucleation, that cannot be doubted; but as regards evisceration, the difference, to our mind, is not great. It has been objected, when that view has been maintained, that the stump of a scleral cavity emptied of its contents, is a very little thing into which to fit the prothesis with a view to rendering it more mobile. But what renders evisceration superior to enucleation and almost equal to anterior amputation from the standpoint of an artificial eye is that all the muscular insertions are preserved, so that the sclero-conjunctival wall of the bottom of the orbit remains capable of moving a well-adapted prothesis.

A. ANTONELLI.

(1) **Lister**, of London, describes a modified operation of evisceration, the object of which is to prevent septic meningitis, when it becomes necessary to remove a suppurating eye or an eye when orbital cellulitis is present, as it usually is in eyes penetrated or ruptured by bullet or large foreign bodies, as fragments of shell. The underlying idea is to leave in place the optic nerve surrounded by a collar of sclera, so that the nerve sheath may not be opened. The steps of the operation are as follows.—1. The contents of the globe are eviscerated, and the retina and choroid are scraped away. 2. The muscles are divided. 3. The sclera is pulled forward and divided far back, leaving nothing but a frill of sclera around the intact optic nerve. The procedure may be modified to suit individual cases. SYDNEY STEPHENSON.

VIII.—TUBERCULOSIS OF THE LACRYMAL PASSAGES.

(1 **Wittich, W.—Involvement of the canaliculi in tuberculosis of the lacrymal sac. (Ueber Beteiligung der Tränenröhrchen an der Tuberkulose des Tränensackes.)** *Klin. Monatsbl. f. Augenheilkunde* Mai, 1913.

(2) **Fage.—Tuberculosis of the lacrymal sac. (Tuberculose du sac lacrymal.)** *L'Ophtalmologie Provinciale*, août, 1913.

(1) **Wittich**, of Jena, comments on the fact that among the great variety of pathological conditions reported to have been discovered in the canaliculi, he has found no reference to tuberculosis of the canaliculi in association with tuberculosis of the sac. In the case which he publishes there had been a swelling in the sac region for six months. The conjunctiva was normal. The sac and part of the canaliculi were excised. The tuberculous process which was found in the sac wall extended along the walls of the canaliculi. The epithelium was no longer squamous, but consisted of a number of layers of cylindrical cells, probably owing to destruction of the superficial squamous cells and proliferation of the deeper cells. He recommends surgeons, in removing a tuberculous sac, to remove as much as possible of the canaliculi, in order to extirpate this possible seat of a recurrence.

A. J. BALLANTYNE.

(2) **Fage**, of Amiens, reports the case of a woman, aged 37 years, who consulted him in February, 1913, and gave the history of dacryocystitis commencing towards the end of 1912. He found the lacrymal sac distended with pus ; there was no redness of the skin and no fistula, no suspicious lesion of the conjunctiva or skin, and the nose was healthy. Several small hard and painless lymphatic glands were discovered in the carotid region on both sides, having no connection, however, with the lesion of the left sac. She was emaciated and dyspnœic. He could make out tuberculous lesions in the apices of both lungs. This led him to surmise the possibility of the lacrymal condition being tuberculous, especially as it is admitted that a dacryocystitis in a tuberculous patient can become infected with the tubercle bacillus. He was unable to find the bacillus in the pus, but a piece of the mucous membrane of the sac introduced under the abdominal wall of a guinea-pig gave rise to an enlargement of the inguinal glands. When this was extirpated three months afterwards, caseation was taking place, and the pus contained Koch's bacillus. The other organs were normal. The sac was excised ; no bony lesion was noticed. Microscopic examination showed a thickened wall, proliferated epithelium, and infiltration of round cells ; only a few giant cells were seen. A sinus remained at the lower end of the wound for some time afterwards.

The author reminds his readers of the three varieties of this affection ; (1) tuberculosis around and without the sac; (2) disease localised to the sac, and (3) lesions of the lacrymal or superior maxillary bones. He also emphasises the importance of a nasal examination in these cases. P. A. HARRY.

IX.—REMEDIES.

(*Fifth Notice.*)

(1) **Dr. X——.—Ocular lesions caused by tincture of iodine. (Lésions oculaires causées par la teinture d'iode.)** *Ann. d'Oculistique*, août, 1914.

(2) **Gradle, H. S.—The modern therapy of pneumococcic infections of the eye.** *Ophthalmology*, October, 1914.

(3) **Ramsay, A. Maitland.—The preventive and curative treatment of pneumococcal ulcer of the cornea.** *Glasgow Medical Journal*, May, 1915.

(1) A doctor, who prefers to remain anonymous, records the case of a child, aged 8 years, suffering from chronic suppurative dacryocystitis, with lacrymal fistula. As the patient had been unsuccessfully treated by all the usual methods, including excision of the sac, Dr. X—— decided to try Wessely's method of injecting tincture of iodine through the fistula until a drop or two passed through the punctum and then at once thoroughly washing the conjunctiva sac with boiled water, to precipitate and remove the iodine. The immediate result was good, but on the fourth day the suppuration had returned. Encouraged by the temporary improvement, Dr. X —— gave four injections on consecutive days with the result that the suppuration was checked, but returned in eight days. A further injection was then given, at the end of which the child shut its eyes tightly and when they were opened, the cornea was found to be stained yellow by the iodine and the iris was invisible. The eye was immediately irrigated freely with boiled water, but the cornea remained yellow and the child had much pain. In ten minutes a soft rosy-white gelatinous chemosis appeared in the conjunctiva of the lower *cul-de-sac* and spread rapidly up to the corneal margin. The pain was less, but there was marked lacrymation and photophobia. Two hours later the yellow colour had disappeared from the cornea, which remained uniformly hazy, and the iris could be seen. The chemosis was unaltered, and the child, who was in a dark room, had ceased to complain. Next morning the corneal haze was barely appreciable and the chemosis had spread over the whole of the bulbar conjunctiva, but was less marked. Its colour was fairly deep red, its consistence harder, and there were some white spots on the lower *cul-de-sac.* For two days the only treatment was irrigation with boiled water, but then a 1 per cent. argyrol ointment was added. In eight days the eye had completely recovered. The lacrymal suppuration remained absent for eighteen days and then returned.

The author concludes that injections of tincture of iodine have a temporary favourable action on lacrymal suppuration, but are not free from risk, and that the action of tincture of iodine on the cornea is vesicative rather than destructive and not so injurious to a healthy eye as that of many other caustics. R. J. COULTER.

(2) **Gradle,** of Chicago, deals as follows with the pneumococcic infections of the eye and neighbouring structures.—Pneumococcic infection of the tear sac, provided that the nasal duct is patent, can be treated by irrigation of the sac with a 1 per cent. solution of ethylhydrocuprein hydrochlorid. A few daily injections are usually sufficient to produce a cure. Cases of the same class can also be treated on Wessely's plan, namely, by the injection of a few drops of tincture of iodine, repeated at intervals of three or four days. This requires a special platino-iridium syringe, and care must be taken to avoid contact of the fluid with the cornea.

In pneumococcic conjunctivitis, ethylhydrocuprein can be employed in the form of 1 per cent. drops or ointment.

Pneumococcal ulcers in the earlier stages can be treated with 1 per cent. ethylhydrocuprein ointment, atropine, and bandaging ; if infection is more thoroughly established, the cautery must be employed, and preference should be given to Wessely's steam cautery, with which the ulcer is massaged for several minutes, the temperature of the cautery being 100° C. In the worst cases the actual cautery will be necessary.

The prevention of pneumococcal infection of operation wounds is ensured by the sterilisation of the conjunctival sac before operation, and the prompt and free administration of hexamine after an ocular injury may prevent infection of the wound or of the interior of the eye by the pneumococcus, as well as by other organisms. A. J. BALLANTYNE.

(3) *Apropos* a case of pneumococcal ulcer of the cornea in a miner injured in the course of his work, **Ramsay**, of Glasgow, discusses the preventive and curative treatment of the condition. As regards the former, general practitioners of medicine, in whose hands this matter lies, should advise excision of the lacrymal sac in all patients affected with dacryocystitis if their occupation exposes them to frequent injuries of the eye. No case of injury to the eye is so trivial that it can be neglected with impunity. A patient with hypopyon-keratitis should be remitted to the eye specialist with as little delay as may be. In such cases the general practitioner should restrict himself to giving first aid. As regards curative treatment, Ramsay advises the usual remedies and, speaking of fomentations, gives the useful hint that they may be rendered more soothing by employing an infusion of chamomile flowers, to a pint of which may be added a teaspoonful of Battley's sedative solution of opium. He has treated thirty-four cases with a 1 per cent. or 2 per cent. aqueous solution of ethylhydrocuprein (" optochin "), applied in a special way to the affected eye.—After the floor of the ulcer has been cleansed with quinine or chinosol lotion, the boundaries of the lesion are defined by staining with fluorescein. A dossel of wool, saturated with a 1 per cent. solution of " optochin," is kept in firm contact with the ulcer for about two minutes. In sensitive subjects, it is advisable to instil cocaine before the " optochin " is applied. At first the applications should be repeated two or three times a day. The good effect should be kept up by the instillation of 1 per cent. " optochin " every hour during the day, and at night by a 1 per cent. " optochin " and atropine ointment, applied as often as possible without interfering with sleep. Relief from pain is prompt, the ethylhydrocuprein producing complete anæsthesia of the cornea. The " optochin " acts only against the pneumococcus, so that Ramsay regards a bacteriological examination as a necessary preliminary to treatment with that remedy. In cases of mixed infection, it is well to apply pure phenol or a 20 per cent. solution of zinc sulphate, in addition to " optochin." Cicatrisation is hastened by the use of 5 per cent. scarlet red ointment or by covering the ulcer (after it is disinfected) with a conjunctival flap.

SYDNEY STEPHENSON.

X.—MISCELLANEOUS.

(1) **Emerson, Linn.—Does cutting the optic nerve elicit perception of light?** *Ophthalmology*, July, 1911.

(2) **Pascheff, C.—Remarks on the hæmatopoetic function of the conjunctiva. (Bemerkungen über die hæmatopoetische Funktion der Bindehaut.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911, p. 332.

(3) **Würdemann, H. V.—The equipment of the specialist. (Eye, ear, nose and throat surgeon.)** *Ophthalmology*, April, 1912.

(4) Hepburn, M. L.—On methods of examination in ophthalmic cases. *Clinical Journal*, October 30th, 1912, and November 13th, 1912.

(5) Moreau.—The history of the cure of a blind-born. (Histoire de la guérison d'un aveugle-né.) *Ann. d'Oculistique*, février, 1913.

(6) Burr, Charles W.—Unusual duration of mental symptoms in a case of atropine poisoning. *Archives of Ophthalmology*, March, 1913.

(7) Karl v. Hoor.—Should a patient be told of his on-coming blindness, or that the existing blindness is incurable? (Soll der Kranke über seine bevorstehende Erblindung und über die Unheilbarkeit seiner Blindheit aufgeklärt werden.) *Centralbl. f. prak. Augenheilk.*, April, 1913.

(8) Stephenson, Sydney.—A case of ocular torticollis. *Proceedings of the Royal Society of Medicine, Section for the Study of Disease in Children*, June, 1913.

(9) Terson, A.—On the disinfection of the hands of the ophthalmologist before operation and in daily practice. (Sur la désinfection des mains de l'ophtalmologiste avant les opérations et dans la pratique quotidienne.) *Ann. d'Oculistique*, août, 1913.

(10) Ewing, A. E.—Sodium chloride a possible cause of some obscure diseases of the choroid and the retina. *American Journal of Ophthalmology*, July, 1914.

(11) Askin, Robert A.—The present position of ophthalmology in school hygiene. *Medical Press and Circular*, August 26th, 1914.

(1) Hess, of Würzburg, considers it proved that section of the optic nerve does not cause a sensation of light, but a patient of **Emerson's**, in whom enucleation was done under a local anæsthetic, stated that at the moment of section of the nerve, he saw "lightning." A. J. BALLANTYNE.

(2) **Pascheff**, of Sofia, thinks that the conjunctiva is not only a covering for the eye, but when pathologically modified, acts as a lymphatic blood sustaining apparatus. He draws attention to the aggregation of plasma cells in trachoma and of plasma cells and lymphocytes in follicular enlargements, such as phlyctenulæ, and, finally, to the production of eosinophil cells in vernal catarrh. T. HARRISON BUTLER.

(3) The article by **Würdemann**, of Seattle, deals more especially with the arrangement of the specialist's rooms, and gives plans and photographs of three actual American "offices." The first belongs to a one-man practice; the second to two partners; while the third comprises some twenty rooms, and belongs to a practice run by a large "office force," including three or four physicians, secretary, stenographer, optician, nurse, and reception room attendant.

A. J. BALLANTYNE.

(4) The interesting clinical lectures of **Hepburn**, of London, are directed towards the instruction of junior students of ophthalmology.

(5) **Moreau**, of St. Etienne, operated on a boy, aged 8 years, for double complete congenital cataract with nystagmus, and investigated with extreme care the amount of visual power which the patient obtained as a result of the operation and the improvement which resulted from training. He found

that the operation merely removed the physical obstacle to sight, but that the development of actual power of vision required methodical training, continued with perseverance for a long period of time, as the visual sensations which have been brought about are liable to be forgotten if the education is interrupted. From the history, which does not lend itself to abstraction, it would seem that the mental development of Moreau's patient was of so low a type that too much reliance should not be placed on conclusions drawn from the case. R. J. COULTER.

(6) **Burr**, of Philadelphia, reports a case of a woman, aged 52 years, who had instilled a standard solution of atropine into her eyes, every three hours for nine weeks. Then sudden excitement set in, with hallucinations ; this lasted for six weeks, but complete recovery ensued. The woman was a thin poorly-nourished person of a commonplace unemotional type, belonging to the working class. There was no neurosis in her past history, and her vascular and renal systems were in good condition. Burr also refers to another case in which hallucinations occurred the first night after using atropine drops ; they recurred each night until the drops were stopped. ROSA FORD.

(7) This problem is one that has been much discussed, and every surgeon must have his own rules.

v. Hoor, of Budapest, comes to the conclusion that each case must be judged by itself in the interests of the patient and his surroundings. He is of opinion that slight vision is of no practical use in the learning of Braille or of some occupation. Completely blind people learn these things just as quickly. Some patients must be told, others may be told, and still others need never be told ; and in any case, before telling, it is well to be certain of the diagnosis, and to make every allowance for anomalous cases.

A. LEVY.

(8) **Sydney Stephenson,** of London, describes and figures a case of purely ocular torticollis—that is, there is no tension on the sternomastoid muscle, and the head can be straightened at will. The patient, a boy, aged 13½ years, who had been under observation for about eight years, has single vision with the head in the twisted position, but develops diplopia when the head is straightened. The head and face are turned towards the left shoulder and the left eye fixes. When the head is straight, there is an obvious upward squint of the right eye. Maddox, of Bournemouth, held that the condition is due to defective development of the left superior rectus, and the head is held to the left, so as to make the least call on this muscle. Stephenson himself added that another explanation was paralysis of one of the extrinsic muscles as the result of whooping cough ; squint and diplopia corrected by the altered position of the head. ERNEST THOMSON.

(9) For disinfection of the hands before ophthalmic operations, **A. Terson,** of Paris, recommends simple immersion in 90% alcohol for five minutes, or light rubbing with a solution of iodine in alcohol not stronger than 1 per 1,000 for five minutes. In either case the hands should be absolutely dry and free from soap before the treatment with alcohol. The method may also be used to replace ordinary washing with soap during consultations, but if repeated too frequently, it tends to cause erosions and peri-ungual tags. R. J. COULTER.

(10) The article by **Ewing**, of St. Louis, amounts to a suggestion, and to nothing more, that excessive consumption of common salt may be a cause of internal eye trouble. S. E.

(11). After pointing out that the present position of eye work amongst elementary scholars is unsatisfactory, **Askins**, of Blackburn, sets himself to inquire what may be done to remedy the defect. Briefly, he suggests that a school doctor should carry out in the school itself an ophthalmoscopic examination of the children's eyes. In other words, the school doctor must be a trained ophthalmologist. SYDNEY STEPHENSON.

(12) **Polliot**, of Besançon, relates—in the droll manner which is so peculiarly French—how, after a forceps delivery, the distressed father appeared before the accoucheur with an eye wrapped up in a napkin and demanded whence it had come. The accoucheur, entirely unaware of having used any undue force, called in Polliot, who found that, indeed, the eye was absent from the orbit. The only explanation forthcoming was that the midwife, who had handled the case a good deal before calling in the obstetrician, had mistaken the orbit for the anus, and gouged out the eye with her finger.

The case is not the first mentioned in the literature in which this accident has happened. de Wecker recorded a case in 1896 (*Ann. d'Oculistique*), and a note of it will be found in the article by the reviewer and Leslie Buchanan in the *Transactions of the Ophthalmological Society U.K.*, 1903.

ERNEST THOMSON.

BOOK NOTICE.

Swanzy's Handbook of the Diseases of the Eye. Edited by LOUIS WERNER. 11th Edition, pages xviii—646, Demy 8vo. Nine coloured plates and 261 text illustrations. London: H. K. Lewis. 1915. Price 12s. 6d. net.

It seems hardly necessary to say much in detail about Dr. Louis Werner's edition of Swanzy's *Handbook* beyond the statement that a most excellent book has been still further improved and brought closely up to date. We had the pleasure of giving a full notice to the tenth edition, by Swanzy and Werner, so recently as 1912. In the present edition, the first since the death of Sir Henry Swanzy, some changes have been made, a few of which it is proposed to notice.—There is a short chapter on the pupil, which was omitted from the tenth edition. It gives the principal facts about the pupil reactions in a form which will be easily understood by the student. The chapter on glaucoma, very naturally, has received attention: certain operations are relegated to smaller type, while Elliot's *technique* of the trephine operation is given greater prominence and is illustrated more fully. The manipulation of the Schiötz tonometer is described and illustrated. Changes appear in the chapter on the retina, mainly in the direction of making it more complete. There is a relatively long paragraph on retinitis exudativa (Coats), and another on capillary angiomatosis (von Hippel). The chapter on nystagmus now includes a lucid account of vestibular nystagmus and its experimental production. One is a little surprised that the actual name of Menière is omitted in connection with nystagmus of this type. though it is possible the author wished to keep clear of the "label," Menière's disease. As in the tenth edition, the coloured illustrations are by the Editor himself, and form a very distinct asset.

We would take the liberty of extending to Dr. Werner THE OPHTHALMOSCOPE'S heartiest congratulations on his first appearance as "Editor" of this renowned *Handbook*, with the author of which he was so long and so closely associated. ERNEST THOMSON.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

THE THEORY OF VISION.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—I have such great respect for the opinion of Dr. T. Harrison Butler that I should like to ask him on what facts he bases his opinion that the rods are percipient elements. I am not aware of a single fact, and I am not alone in this opinion (see Nagel, "Physiol. des Menschen," Vol. 3, p. 107).

I may be biassed, but to me it is quite inconceivable that the cones can be stimulated by light acting directly upon them, or by means of photo-chemical substances present in them. Let the reader picture to himself the condition of the thin cones of the fovea after light had acted on them; how would the photo-chemical substances be restored? It must be remembered that there is no direct blood supply to the cones. Whereas if we assume that the cones are stimulated by the decomposition of photo-chemical substances in the liquid surrounding them, we have an easy explanation of vision which accounts for a large number of previously inexplicable facts, of which I will only mention one which appears to me to prove conclusively that the photo-chemical stimulus is external to the cones, and that is, that positive after-images can change their relative places in the field of vision. If the reader on awakening in the morning arrange a mirror so that the sun is reflected from its surface, one eye being closed and covered with the hand, the other is opened and closed for a fraction of a second whilst directed towards the mirror and then covered with the hand. The result is a clear-cut positive after-image of the sun on a black background and nothing else is visible in the field of vision. If the head be moved sharply to one side, the after-image elongates into a sausage-shaped form with irregular knobs on it. If the head be very sharply jerked, the eyes being closed all the time, we can separate the after-image into two or more distinct after-images. I find that these experiments, whilst very easy to do immediately after sleep in a darkened room, are much more difficult later in the day. This is probably due to the processes of the pigment cells being retracted, and thus allowing the fluid around the cones to move freely.

Faithfully yours,

LONDON, *May 7th.*

F. W. EDRIDGE-GREEN.

FUND FOR BLIND SOLDIERS AND SAILORS.

To the Editor of THE OPHTHALMOSCOPE.

DEAR SIR,—Mr. C. Arthur Pearson has initiated a fund to assist those of our sailors and soldiers who have lost their eyesight during the present war. Although there exist so many calls for help one cannot help thinking that this appeals particularly to ophthalmic surgeons *and to their patients.* The gratitude which our patients often express for the blessing of restored vision can surely be most practically expressed by donations to such a fund.

At my suggestion Mr. Pearson has made a collecting box to lie on one's consulting room table, where it can scarcely give offence, and may appeal silently and strongly to a type who can realise the full meaning of the fate of those on whose behalf it speaks.

Perhaps others, willing to have the same in their own rooms, would write and ask for a box, which Mr. Pearson will be only too pleased to send.

WINTER'S BUILDINGS,
ST. ANN STREET,
MANCHESTER.
May 14th, 1915.

I am,
Faithfully yours,
A. A. BRADBURNE.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

ANNUAL CONGRESS, 1915.

THE Annual Congress of the Ophthalmological Society of the United Kingdom was held in London on April 22nd, 23rd, and 24th last, under the presidency of Mr. F. Richardson Cross, of Clifton, Bristol.

The meetings for set discussions and the reading of communications were held at the house of the Royal Society of Medicine, 1, Wimpole Street, W., and a clinical meeting for the presentation of cases was held on the afternoon of the 23rd of April at the Royal London Ophthalmic Hospital, City Road, E.C. The meetings were well attended, many extra-metropolitan members being present, the discussions were lively, and some of the cases exhibited at the clinical meeting were of unusual interest. Altogether, the executive may be congratulated upon the success of the Congress.

The Nettleship Medal and Prize were presented to Mr. E. Treacher Collins for his valuable work in ophthalmology. We feel confident that the award will be a very popular one among those who know (and who does not ?) the sterling value of Mr. Collins' work, especially in the pathology of the eye.

The discussion on "Ophthalmic Injuries in Warfare," which was held on the afternoon of April 22nd, was opened by Mr. W. H. H. Jessop, who based his remarks largely upon the cases of injury in the present war seen by him at St. Bartholomew's Hospital and No. 1 Base Hospital. Colonel W. T. Lister, who was to follow, was unfortunately absent, but his paper, along with Mr. Jessop's, had already been printed and circulated among the members of the Society, and an abstract of each was published in the May number of THE OPHTHALMOSCOPE. The discussion was continued by Messrs. E. T. Collins, P. H. Adams, G. H. Pooley, L. V. Cargill, George Mackay, R. R. Cruise, F. G. Thomas, A. L. Whitehead, Priestley Smith, M. M. Townsend, J. Gray Clegg, Colonel R. H. Elliot, Professor Landolt (Paris), and the President.

A discussion on "Detachment of the Retina" took place on the morning of April 23rd, and was opened by Messrs. Stephen Mayou, Leslie Paton, and A. Maitland Ramsay, whose respective communications may be found in abstract in the May number of this periodical. The debate was continued by Sir Anderson Critchett, Bart., Messrs. E. T. Collins, R. R. Cruise, J. B. Lawford, Sydney Stephenson, D. L. Davies, P. W. Maxwell, J. B. Story, C. Higgens, George Mackay, and the President. The tone of the discussion was distinctly hopeful, and there seemed to be a general feeling that puncture of the sclera with the galvano-cautery, in addition to rest in bed, should be tried in suitable cases. A sub-committee of Messrs. Story, Ramsay, Paton, Mayou, Greeves, and E. T. Collins was appointed "to collect, critically examine, and collate cases of reported cure of detachment of the retina."

The following office bearers were elected for the year 1915-1916: *President.*—W. H. H. Jessop. *Vice-Presidents.*—J. B. Lawford, F. Richardson Cross, A. Maitland Ramsay, and Sydney Stephenson.—*Treasurer.*—James Taylor. *Council.*—Elmore Brewerton, A. J. Ballantyne, W. H. McMullen, Gordon Holmes, J. Craig, and H. L. Eason. *Secretaries.*—S. A. K. Wilson and George Coats.

NOTES AND ECHOES.

Deaths.

We regret to announce the death of Sir William R. Gowers, which took place on May 4th at his residence, 34, Ladbroke Square, London, W.

Sir William was born on March 20th, 1845, and had a brilliant career at Christ Church School, Oxford, and University College Hospital, London. He was a Fellow of the Royal Society, an honorary graduate of the Universities of Edinburgh and of Dublin, and a member of many Continental learned societies. In recognition of his eminence as a neurologist, Gowers received the honour of knighthood in 1897. He was closely connected with ophthalmology, and to his acute mind that branch of medicine is indebted for many observations of great practical value. His "Manual and Atlas of Medical Ophthalmoscopy," edited by the author and the late Marcus Gunn, reached a fourth edition in 1904. He was an original member of the Ophthalmological Society, and served on the first Council from 1880 to 1883. He delivered the Bowman Lecture of the Society in 1895, taking as his theme the "Subjective Sensations of Sight," and was one of the few British honorary members of the Society. He retired from active practice some time ago. Sir William Gowers married the daughter of Mr. Frederick Baines (of Leeds), and had four children, two sons and two daughters. Lady Gowers died a couple of years ago. The funeral service for Sir William was held on May 6th at St. Peter's, Vere Street, London, W. The interment was private.

James Huxtable Bendle died suddenly on April 13th at the age of fifty years. He had been in delicate health for several years. Originally in general practice at Abbots Bromley, Staffs., he gave that up in 1908 for reasons of health, and in the following year was appointed ophthalmic school officer and assistant school medical officer to the Somerset County Education Committee.

The deaths of the following ophthalmologists are announced by the *Ophthalmic Record* under date March last:—Charles A. E. Lesage, Dixon, Ill.; E. M. Anderson, Spokane; Isaac Leopold, Philadelphia; Henry Bezou, New Orleans; G. H. Desjardins, Montreal; Fred H. Weir, Portland, Oregon; and Dudley Reynolds, Louisville, Ky.

The following American ophthalmologists are also dead: Drs. Guthrie, of La Salle, Ill., and Lack, of Brooklyn, N.Y.

H. Schiess-Gemuseus has died at the ripe age of 82 years. He retired from the chair of ophthalmology in Basle, Switzerland, at the age of 60 years, and subsequently had the misfortune of becoming totally blind, from detachment of the retina in one eye and from cataract in the other. He was a voluminous writer on subjects connected with the eye.

We have learned but recently of the death of Professor Luigi Guaita, which occurred on December 30th last, at Florence. Guaita was one of the Editors of the *Annali di Ottalmologia*, and was director of the Ophthalmic Hospital at Florence. He was well known as a writer on ophthalmic subjects.

Professor Jean Alfred Fournier, of Paris, the authority on syphilis, is dead.

* * * *

Dr. Wendell Reber.

DR. WENDELL REBER has been appointed to succeed Dr. W. Campbell Posey on the Pennsylvania Commission for the Conservation of Vision. Dr. Reber's many friends in this country will welcome the appointment. Those familiar with his personal charm and mental alacrity will be persuaded that it would be difficult to find a better official.

* * * *

A new Ophthalmological Congress.

IT is announced that the Colorado Ophthalmological Society is arranging an Ophthalmological Congress, based on the lines of the Heidelberg and the Oxford meetings, to be held in Denver on July 22nd and 23rd next. A cordial invitation is extended to all ophthalmic surgeons.

* * * *

Appointments.

THE undermentioned gentlemen have been appointed temporary assistant surgeons to the Royal Eye Hospital, Southwark, London:—F. D. Bennett, A. E. A. Loosley, and T. W. Letchworth.

John Wharton has been appointed one of the Medical Referees under the Workmen's Compensation Act for ophthalmic cases for County Court Circuit No. 8, and for the Salford County Court Circuit No. 7.

R. H. Dickson, the ophthalmic surgeon of Newcastle-under-Lyme, has been appointed honorary secretary of the newly-formed North Staffordshire Medical Society.

James Williamson has been appointed ophthalmic surgeon to the Bury Infirmary in place of G. Aubrey Jelly, granted a commission in the R.A.M.C.

Sydney G. Tibbles, temporary lieutenant R.A.M.C., has been appointed specialist in ophthalmology to Devonport Military Hospital.

Arthur Greene has been appointed ophthalmic surgeon to the Norfolk War Hospital.

J. C. Mitchell-Leonard has been appointed acting ophthalmologist to the Melbourne Hospital.

T. Herbert Bell has been appointed lecturer in clinical ophthalmology in the Manitoba Medical College.

Drs. W. A. Parr and Nils Remmen have been appointed surgeons to the Illinois Charitable Eye and Ear Infirmary, and Drs. von. der Heydt, Woodnick, Geraghan, Lebensohn, and Eiss, assistant surgeons to the same Institution.

Dr. G. Luigo Colombo, assistant in the ophthalmic clinic in the University of Parma, has been appointed *dozent* in ophthalmology.

* * * *

Mr. J. B. Lawford.

WE hear that Mr. J. B. Lawford will again offer himself as a candidate for the Council of the Royal College of Surgeons of England. It is but fitting that a representative of ophthalmology should occupy a seat on the Council, and THE OPHTHALMOSCOPE wishes Mr. Lawford every success.

* * * *

A Curious Accident.

AN inquest was held on May 20th in London on the body of a clerk, who came into collision with a stationary van while riding a motor-cycle between Twickenham and Richmond. A verdict was returned that death was due to wounds in the eye caused by the breaking of the man's eye-glasses.

THE OPHTHALMOSCOPE DIARY.

1915.

Midland Ophthalmological Society.	June 1st.	Shrewsbury.
Royal Society of Medicine: Section of Ophthalmology	June 9th	1, Wimpole Street, London, W.
American Medical Association: Section on Ophthalmology	June 22nd to 25th.	San Francisco.
American Ophthalmological Society	July 6th & 7th	New London, Conn.
Oxford Ophthalmological Congress	July 15th & 16th	Keble College, Oxford.
Colorado Ophthalmological Congress.	July 22nd & 23rd	Denver.
American Academy of Ophthalmology and Oto-Laryngology	Oct. 5th to 7th	Chicago, Ill.

NOTE.—The French and the Heidelberg Congresses will not assemble this year.

THE
OPHTHALMOSCOPE.
A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

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ORIGINAL COMMUNICATION.

A CLINICAL STUDY OF FIFTY-FIVE CASES OF INTRA-OCULAR RETENTION OF FOREIGN BODIES, WITH RESULTS TWO YEARS AFTERWARDS.

BY

W. Barrie Brownlie, M.D.Glasg., F.R.C.S.Edin.,

ASSISTANT OPHTHALMIC SURGEON,
BLACKBURN AND EAST LANCASHIRE ROYAL INFIRMARY.

Introduction.

I SHALL endeavour in this communication, as the title suggests, to discuss what appear to be the most important points in the diagnosis and treatment of foreign bodies in the eyeball. I shall then describe the individual cases very shortly in so far as they have a bearing on the points previously mentioned, along with the actual condition of the eyes, the great majority of which were examined two years after the date of injury. I think the latter has a most important bearing on the actual results and statistics of this sort. It is not enough to say that a piece of metal has been extracted from the eye by the electro-magnet, and that the eye was "saved." It is more important to find out what is the visual acuity of the injured eye at least a year after treatment, and whether any subsequent complication has developed, such as detachment of the retina or sympathetic ophthalmia. In this connection I agree with Rogers[1], who points out that we must be careful in accepting without reserve statistics of favourable immediate results in cases where a foreign body has been removed from the interior of the eye. He mentions eleven cases with good primary results which returned with secondary degenerative changes, and as he has seen several such cases from other *cliniques*, he supposes that other cases, which did not return, suffered in the same way.

Most of my work was collected while I was house-surgeon at the Glasgow Eye Infirmary in the years 1911 and 1912. At Glasgow, owing to the great ship-building industry on the Clyde, this variety of work constitutes the bulk of the eye injuries, and, as accidents of this sort fall to the lot of the house-surgeon to treat, I had an excellent opportunity of studying the cases clinically. With regard to the magnet operations, these (unless otherwise stated) were carried out by myself, as were also several of the enucleations and traumatic cataracts, although many of the latter were performed by the surgeons of the Hospitals, to whom I am indebted for allowing me to publish these cases.

Those cases where the foreign body in the eye has been a non-magnetic substance, like glass, and penetrated by the X-rays, have been omitted. I have adhered strictly to those cases where the foreign body has been composed of iron, steel, etc., to show the great importance of X-ray work and of the electro-magnet in the diagnosis of these cases.

When we consider the number of eyes that are removed all over the country consequent on an injury of this sort, it is astonishing to find that most workmen wear no protection while following their occupation. When one asks the men why they do not wear some sort of goggles, like the stonebreaker we see in the country lane, they will probably tell one that they are not allowed to wear any protection, and on asking the managers of the various works why the men do not wear any protection, they will say that the men refuse to wear anything of the kind. There the matter stands.

Diagnosis of the presence of a foreign body in the eye.

When examining a case, the following points should be kept in mind :—

(1) The history.

(2) Vision of both eyes.

(3) External examination of the injured eye, aided by a convex lens with oblique focal illumination, and a Coddington lens, if necessary. This includes :—

(i) The eyelids and surrounding parts ;

(ii) the cornea ;

(iii) the depth and contents of the anterior chamber, *e.g.*, hyphæma and hypopyon ;

(iv) shape of the pupil ;

(v) engagement in or actual prolapse of iris through the wound ;

(vi) iris ;

(vii) lens ;

(viii) anterior part of the vitreous humour ;

(ix) the globe outside the cornea.

(4) The tension of the eye.

(5) Ophthalmoscopic appearances.

(6) X-ray diagnosis.

(7) Electro-magnet diagnosis.

(1) *The History.*—One should listen carefully to the history. Obviously, a case which presents itself with a history of having been struck in the eye with scissors or a hat-pin, is not likely to have a foreign body lodged inside the eyeball, but where there is a history of something having struck the eye whilst the patient was working among iron or steel, we should proceed on the supposition that a foreign body is present, and conduct our examination in the methodical way which I am about to describe. In these days of the Workmen's Compensation Act, when a workman will occasionally tell you that a particular injury happened to his eye, which he now thinks is responsible for his eye condition, and when, in many cases, the two conditions have no connection, we are apt to be somewhat sceptical when a man says he has been struck in the eye by a chip of metal, say, a fortnight ago, and on examination, we find no evidence of a corneal or scleral wound, and, although the eye looks a little injected after a casual examination, we find that his vision is fairly good and put it down as a case of ordinary conjunctivitis.

I think it is much safer to go systematically through the methods which I shall presently describe, even although one has only the faintest of suspicions as to there being a foreign body in the interior of the eyeball. It pays better to do so in the long run, as probably the case will come on for trial, and we find out perhaps that we have not done what we should have done as regards having made a thorough examination of the eye.

I may here describe the main features of a case illustrative of this point :—

Case 23.—T. M. came to the out-patient department of the Glasgow Eye Infirmary on January 8th, 1912, with a history of having been struck in the left eye four days previously with a chip of iron rust whilst following his occupation of a boiler maker. Careful examination of the eye failed to show any sign of a recent wound or abrasion. The lids were slightly œdematous, and signs of iridocyclitis were present in the form of circumcorneal injection, a contracted pupil dilating irregularly under atropine, exudate in the pupillary area, and one millimetre of hypopyon. The vision of this eye was reduced to hand-movements. The vision of the other eye which was in every way healthy, was 6/6. The patient was admitted to the Hospital the same day.

On admission, the magnet was applied and was negative at all points. As I shall point out later when speaking of X-ray diagnosis, I always advocate the taking of an X-ray plate before applying the magnet, and most certainly if there is any reason to suspect the presence of a foreign body in the eye and the magnet is applied right away and is negative, then a plate should be taken afterwards. No X-ray plate was taken in this case, however, owing to my temporary absence, and when the magnet operation was found to be negative, the case was looked upon as one of gonorrhœal iridocyclitis, since the man acknowledged having had gonorrhœa some three weeks previously, and there was still urethral discharge containing gonococci.

The man's story of having been struck in the eye by a chip of rust was disregarded or thought to be in the nature of a mere coincidence. Under local treatment and anti-gonococcal serum, he improved somewhat. His blood was then examined and the Wassermann re-action found to be positive, and he received an intravenous injection of "606." He was dismissed after being a month under treatment, and then attended the out-patient department. During that time he claimed compensation from his employers for the loss of the eye, but failed on the strength of the medical evidence that the case was one of gonorrhœal or syphilitic iridocyclitis.

Two-and-a-half months after the injury (?) he was advised to have the eye enucleated, owing to recurrent iridocyclitis, the eye having practically no vision and showing a tendency to soften. He was admitted as an in-patient for the second time.

The day before the enucleation, I took an X-ray plate, which showed quite distinctly a piece of metal, lodged in the outer part of the sclera. I enucleated the eye, and, on hooking up the external rectus muscle, the hook grated against the foreign body, which was found to be firmly embedded in the sclera: It had evidently travelled through the eye in an oblique direction from within outwards, causing sufficient damage to set up an acute iridocyclitis.

I record this case at length, not so much to point the mistake of not having taken an X-ray plate at the very first (the mistake was quite legitimate, and, if the foreign body had not been lodged in the sclera, the magnet would in all probability have been positive), but as an example of the importance of not neglecting the patient's story, and of going about these metal cases in a systematic way.

The patient will sometimes volunteer the statement that it was a large chip of metal which struck him in the eye, and that it fell down to the ground after it struck him. This, with perhaps the presence of a large penetrating wound of the eyeball, would rather make one think of the eye being empty, so far as a foreign body is concerned. Of course, one would not base a diagnosis on this, but, like the other points which I am about to mention, it has to be kept in mind whilst carrying out the examination of the eye.

(2) *Vision.*—The vision of both eyes should always be taken when a case of this sort presents itself. In this connection, the visual acuity of the injured eye helps in the diagnosis of the presence of a foreign body, and subsequently in the prognosis and progress of the case. Again, the taking of the vision of the uninjured eye helps in the examination of the case

perhaps where there is a claim for compensation afterwards, and is also a help in the diagnosis of any sympathetic ophthalmia occurring later on.

The two common causes of failure of vision in cases of this sort are: a traumatic cataract and hæmorrhage.

If the case is recent, hyphæma may obscure vision, but the hæmorrhage is usually into the vitreous.

Of course, I am well aware that there may be practically no loss of vision, especially if the foreign body is in the anterior chamber, or embedded in the iris, but that is the exception, as shown by a comparison of cases with retention of a foreign body, and penetrating injuries where no foreign body is present. (Compare first and second tabulated lists.)

Any contraction of the visual field, which Berry[2] says is one of the most important points in the diagnosis of a foreign body in the vitreous rendered difficult by the opacity of the lens, is not now of so much importance owing to the more recent methods of diagnosis by the magnet and X-rays, unless in some cases where the wound is scleral, when a detachment of the retina may be suspected, *e.g.*, case 43.

(3) *External Examination of the Injured Eye.*—We should carefully examine for the presence of a wound, and having found one, determine whether it is penetrating or not. As a rule, the patient, after a recent injury of this sort, does not complain of any pain in the eye.

I shall now take each of these parts, the sub-headings of (3) individually, and try to describe what I consider to be the more important features, of which the presence would cause one to suspect the existence of a foreign body within the eyeball.

(i). Eyelids and surrounding tissues.—The most important point to be looked for is a penetrating wound or an abrasion, either of the upper or lower eyelid.

The wounds of the eyelid are usually one of two varieties :—

(*a*) A small penetrating wound of the lid. A penetrating wound of this sort indicates that the foreign body must have been travelling at a high velocity to enable it to pierce a tough substance like the tarsal plate. If one finds an external wound of the lid, then he should examine carefully to see whether it penetrates or not. The wound on the other side, that is, the conjunctival aspect, may appear at first sight to be a mere spot of ecchymosis, the actual wound being much smaller than the skin wound, owing to the conjunctiva closing quickly over it. When one finds such a hole, and behind it, or near it, a penetrating wound of the globe, usually of the sclera with escape of vitreous, and a lowered tension with loss of vision, there is a strong suspicion of a foreign body being present in the eye. Scales with sharp edges usually produce this class of injury. (See cases 6, 24, 32, 3, 7, 40 and 43).

(*b*). A vertically or obliquely split lid with a very much softened globe and a large penetrating wound of the eyeball behind, is indicative, usually, of the presence of a large scale in the eye, although in some of these cases the metal, after inflicting the injury, falls out again. (See cases 14 and 19).

One should also carefully examine the surrounding orbit, nose, and cheek, as the foreign body may be lodged there, sometimes indicated by tender points. (See case 3).

(ii). The cornea.—The wound may be in the cornea, or it may extend to the ciliary region.

I may specially mention one class of case and that is where a small piece of metal has passed through the cornea and come to lodge in the posterior part of the eyeball, or in the orbit beyond. The appearance is almost characteristic. The corneal wound is, as a rule, linear, especially if the foreign body is in the nature of a small scale. The fact that it is penetrating is shown by the presence of a greyish-white line, which looks like a scar, in the posterior part of the cornea. This appearance is probably due to a break in the continuity of the elastic membrane of Descemet. The anterior chamber is, as a rule, full or nearly so. The tension is but little if at all diminished. (See cases 16, 17, 20, 30, 31, 49, and 47).

If the centre of the cornea is pierced, a wound of the anterior capsule of the lens may be made out, also the track of the foreign body after it passed through the lens to the parts beyond. If the corneal wound is not central, then one may see a " rent " or " hole " in the iris, which must not be mistaken for a pigment spot. This variety of corneal wound is so small that it may be overlooked, but in a case of this sort the vision would probably be affected, and if the examination be gone about in a proper way, the presence of the foreign body is not likely to be missed.

(iii). Depth of the anterior chamber.—An empty or a shallow anterior chamber is frequently met with in wounds of the cornea and ciliary region with no retention of a foreign body in the eye. As regards the diagnosis of the presence of a foreign body it is, in my opinion, of little value. As I have mentioned in the class of corneal wound above, the anterior chamber is frequently full.

Hyphaema.—In a recent case, blood may be present, but is frequently absent, as it soon becomes absorbed.

Hypopyon.—This is only seen, as a rule, a few days after the injury, and, although indicative of mischief in the ciliary body, as regards the diagnosis of the presence of a foreign body, has little or no value.

(iv). Alteration in the shape of the pupil.—This sign, of course, is practically always present when there is a prolapse. It is when it is present with no prolapse that it becomes more important. The pupil may be a little irregular owing to a bit of metal in the posterior chamber catching on the free edge of the iris, and the metal is often seen.

(v). Prolapse, or engagement of the iris in the wound.—While the iris may be engaged in the wound where the metal has entered through the corneoscleral region, or even become actually prolapsed, in the pure corneal wounds caused by a penetrating foreign body, there is frequently no prolapse. In fact, iris prolapse in pure corneal wounds I consider to be rather against the presence of a foreign body. It is specially absent in those small penetrating corneal wounds with the foreign body at the back of the eyeball or beyond. In one case (22) a small spicule was actually entangled in the prolapsed iris.

(vi). The iris.—This frequently throws some light on the subject. As I mentioned before in connection with corneal cases, a " hole " in the iris with a small corneal wound makes one very suspicious of the presence of a foreign body in the eyeball. (See cases 17, 29, 30, 31, 34, 40, and 49).

We must be careful not to mistake a pigment spot in the iris for a foreign body. A little experience is necessary in distinguishing between these two conditions, and in a few cases diagnosis is very difficult. I have seen, on more than one occasion, a competent ophthalmic surgeon make a mistake between these three conditions (" hole," foreign body, and pigment spot).

An examination of the iris of the uninjured eye may help considerably, of course, in the diagnosis, pigment spots being frequently present in both.

The iris may bulge forward at a point, owing to the pressure of a foreign body behind it, in the posterior chamber, or be retracted at a point (see case 2) owing to a foreign body having passed through it, and under atropine dilatation it is found that this point is bound down to the anterior capsule of the lens.

(vii). The lens.—One should examine for the presence or absence of cataract, and whether that cataract, if present, is more dense at a particular point. Again, one should examine for the presence of a track of a foreign body having passed through the lens. I shall speak of this more fully in connection with the ophthalmoscopic appearances.

(viii). Anterior part of the vitreous humour.—In a case coming three or four days after injury, one frequently sees the tell-tale yellow reflex indicative of pus in the vitreous and of plastic irido-cyclitis.

(ix). The globe—external to the corneo-scleral junction.—One can hardly miss the characteristic penetrating wound with pouting edges and vitreous oozing out. A bit of metal may be seen to be sticking in the wound, or protruding from it. We must be careful not to overlook a scleral wound which is partially healed

(4) *Tension.*—This is important both in diagnosis and in prognosis. A greatly diminished tension from loss of vitreous usually shows a loss of vision at the time of the injury. Later on, a sudden diminution in the tension, with corresponding loss of vision, indicates either a vitreous hæmorrhage, or usually a detachment of the retina at the site of the original wound.

(5) *Ophthalmoscopic Examination of the Injured Eye.*—This, as a rule, does not afford much information in an eye which has been recently injured. In the first place, where the metal has caused a traumatic cataract, or, having passed through the lens or sclera, has become lodged in the posterior part of the eye, or in the orbit beyond, the media are, as a rule, very hazy, owing to the presence of opacity in the lens or to blood in the vitreous or anterior chamber. Again, in a recent injury of this sort, the eye is irritable to light, and, to say the least of it, the patient does not like the procedure. Still, I think the examination should not be omitted, even in a recent case, and especially in an older case where the media are more transparent if the lens has not been injured. Particular attention should be paid to the following points :

(1) The lens.—Two points ought to be specially looked for here :

(*a*) In some cases, *e.g.*, 9 and 15, one can actually see the foreign body lodged in the lens, but one must be careful not to mistake a small localized cataract for a foreign body. A common fallacy of this sort is where the foreign body, usually a blunt object like a tennis ball, or a non-penetrating pellet, striking the eye (especially when seen some time after the injury), has caused a small opacity in the anterior capsule, which is really a healed wound at the point of rupture of the anterior capsule, causing concussion-cataract, often localized at a small point beyond in the substance of the lens.

(*b*) A point of rupture of the anterior capsule, with a distinct track through the lens and a dense point in the substance of the lens may indicate the likelihood of a foreign body being lodged at the denser point. Again, a point of rupture in the posterior capsule at the end of the track, may indicate similarly the foreign body being lodged in the posterior part of the eye, or beyond. This is specially seen in those small penetrating corneal wounds where the metal is lodged at the back of the eyeball or in the orbit beyond.

In the examination of the lens with the ophthalmoscope, I would draw attention to a condition which is liable to be mistaken for an exit wound (passing from the lens into the vitreous) in the posterior capsule of the lens. This is a small localized exudate on the posterior capsule, often seen a few days after injury, and especially caused by a blunt object, such as a golf or a tennis ball. It is probably due to the exudate in the vitreous, or on the posterior capsule of the lens, from ciliary body irritation.

In conducting the examination ophthalmoscopic sterilized atropine, and cocaine in a recent case, ought to be put into the eye, but the examination should not be too exhaustive and should occupy only a few seconds.

In any case, as I shall mention later, atropine should be instilled both with regard to further diagnosis and to treatment by the electro-magnet.

In an older case where the eye is quiet, homatropine may be used, and a more prolonged examination may be made if the condition permits of it, and, the media being clearer, as a rule, more satisfactory results can be obtained.

(2) The vitreous.—As mentioned before, in a recent case the vitreous is usually full of blood clot, and one of these clots, suddenly floating up in the line of vision, may cause the inexperienced, while using the ophthalmoscope, to say that he sees the foreign body.

Although in a few cases, *e.g.*, case 24, the metal can be made out, being recognised by its glistening aspect, I also consider the following points as very probably indicative of a foreign body being in the eye:

(1) A "vitreous track."—This is sometimes seen, if the media are sufficiently clear, in wounds of the sclera where the foreign body has passed in an oblique or transverse direction through the eye. Starting at the wound of entrance, a definite track may be made out passing through the vitreous. This appears to be dark to the ophthalmoscopic examination. (See cases 24, 28, and 32.) At the end of this track, the foreign body may in some cases be noticed swinging about in the vitreous when the eyeball moves.

(2) Air bubbles (See cases 17 and 55).—These are liable to be mistaken for foreign bodies. Berry[3] gives the differential diagnosis between an air bubble and a foreign body in the vitreous. He points out that air bubbles are frequently multiple, and have a clear centre with a dull margin; a piece of metal is single, having a dull centre with a glistening margin. He says that if these points be attended to, a mistake is not liable to be made.

I think it is important not to build a diagnosis on these facts, as the presence of air bubbles simply indicates that a penetrating wound of the eyeball is present, and, in each of the two cases of my series where air bubbles were present, a piece of metal was also found to be present on subsequent examination by the X-rays and the magnet.

(3) The retina.—The general rule that ophthalmoscopic examination in a recent injury is of little value, except where the media are clear, applies to the retina as well. In an older case, or in a recent one where the media are sufficiently clear, the two special points to be looked for are:

1. Where the foreign body being lodged in the retina and sclera, is noticed by its glistening aspect, and by having a focus different from that of the retina (See case 2).

2. Where there is a hole in the retina, the foreign body having passed through the globe to the orbit beyond. It is well to make sure that the disturbance of pigment here met with is not "physiological."

In a recent case one sees a break in the continuity of the retina which is surrounded by blood extravasation. In an older case there is a definite gap surrounded by choroidal pigment, or there may be simply a large mass of pigment at the site of the original puncture.

It often happens that where one or several of the foregoing signs are present, we can almost be sure that the foreign body is lodged in the eyeball, or at least has passed through it.

Although I have described at some length the ophthalmoscopic appearances in these cases, I regard this part of the examination, which usually does not take more than five minutes, unless one waits for the dilatation of the pupil, as merely preliminary to the more certain methods of diagnosis to which I shall now pass. In a case of this sort, unless one finds after a careful examination that it is unnecessary, the eye ought to be subjected to a routine examination as follows :—

First, a preliminary examination of the eye, aided by the ophthalmoscope if possible ; then, the taking of an X-ray plate, followed by the electro-magnet. A second X-ray plate should then to be taken, if the one preceding the magnet operation is positive and the magnet is negative, to confirm the first plate, or to see if there is any change in the position of the foreign body. If this is done in an orderly manner, I do not think there is any fear that a foreign body will be missed.

I may be pardoned if I appear to be insistent on a careful scrutiny of these cases. I do not do so without reason. I am sure it is the experience of many ophthalmic surgeons not rarely to come across a patient who will say that he was subjected to a magnet operation at some other hospital, and was told that there was no foreign body in his eye, when subsequent examination, aided, it may be, by an X-ray plate, or after examination of an enucleated eyeball, reveals the presence of a piece of metal in the interior of the eye.

(6) *X-ray Diagnosis.*—As practically all my cases concerned metal, they afforded an excellent opportunity for X-ray work. I think that an X-ray photograph should never be omitted, even where one is certain of a foreign body being present, or, on the contrary, where one is almost certain that there is no foreign body present, but where there is some element of doubt. For many reasons, the taking of an X-ray plate before examination and treatment by the electro-magnet is desirable.

In all my cases, with the exception of two at the commencement of the series, a plate was taken before he electro-magnet was used. The following are the more important reasons for taking an X-ray plate before using the magnet.—First, the position of the foreign body can be made out with fair accuracy, even by the method which I shall describe, apart from the Mackenzie Davidson localisation. Secondly, the size of the metal can also be estimated with a fair degree of accuracy. If the metal is large and the eyeball is badly damaged, it is better to give a general anæsthetic and obtain permission for enucleation, if thought necessary ; otherwise much unnecessary pain to the patient is caused, and the probability of a second operation for enucleation of the eyeball is avoided. Thirdly, there may be more than one foreign body present. I had one case (39) of this kind, when the electro-magnet was used right away, owing to the X-ray apparatus not being in order, and a small scale of metal (5 mm. × 2 mm.) was extracted. As the eye was still irritable some weeks afterwards, an X-ray plate was taken, and a large foreign body was then localised behind the eyeball. This case is a rare one, but the mistake was a lesson, since the other eye developed sympathetic ophthalmia.

Of course, if there is a piece of metal in the eye, the sooner it is removed the better, but the taking of the X-ray plate, as a rule, did not occupy me for more than five minutes. The patient was then sent up to the theatre, and while the sister was putting cocaine and atropine in the eye, preparing the patient, and getting the magnet fixed in position, the process of developing and fixing the plate was carried out.

In all the cases which were X-rayed, I missed only two foreign bodies. See case 11, where the plate was negative, but on naked-eye inspection, there was suspicion of a small piece of metal in the iris, and the electro-magnet extracted a small spicule, ½ mm. long; and in case 22, where the plate was negative, and a small spicule, 1 mm. long, was extracted from the prolapsed iris by the magnet. I had a few doubtful cases which were decided by the electro-magnet, or a second plate, if necessary.

What an ophthalmic surgeon chiefly wants to know is whether the foreign body is extra-ocular or intra-ocular. In these days of the giant magnet, the exact locality of the foreign body in the eye in the recent injury is not so important as it was when the small magnet was alone in use.

I may describe the two methods of X-ray work which I used:

Boxer's method[1].—Boxer points out "that probably in no part of the body is the rendering of the true value of the relative position of parts more difficult than in dealing with the eye and orbit, because of the very overlapping of parts. From the nature of things, the radiograph must be taken through the head laterally, and, try as one will, one cannot avoid the perplexity produced by them. Indeed, it is only after looking constantly and daily at orbital radiographs that one can give a true rendering of things."

Boxer's method, which I have adopted in the majority of these cases, is to use ·5 to ·6 m/a of current, and give an exposure of three minutes, leaving only nine inches between the face and the anticathode. Of course, the thickness of the skull bones, and the hardness or softness of the tube, will alter the procedure, but this current and time exposure are excellent in the majority of cases.

The patient is seated on a chair with the plate enclosed in an ordinary half-plate photograph printing frame, and fixed to the head next the injured eye by elastic bands, which are fixed on brass runners on the sides of the printing frame. A small diaphragm greatly sharpens the image.

To get the least overlapping of parts, it is best to advance the centre of the anticathode half-an-inch in front of the malar of the uninjured side, so that the rays, so to speak, are looking somewhat into the injured orbit. This prevents the shadow of the near malar overlapping the shadow of the distant one—that is, the malar of the injured side.

There are two objections to this position: (i). That the shadow of the foreign body is thereby projected further posteriorly than is actually the case, and (ii). Theoretically, the correct position for the relative position of the plate to the anticathode is that the former shall be at right angles to the central rays of the anticathode, but these are allowed for in reading the plate, and if one always adopts this position there is little likelihood of error. To be certain that the relative position of the plate to the anticathode is correct, one should look through the back of the tube through the diaphragm, and in doing so, the surgeon should look somewhat into the injured eye, depending on the height of the nasal bridge. An ordinary photographer's head clip fixes the patient's head securely. The patient is told to look fixedly straight forward at some object.

When there is a doubt after taking a plate by this method, or after the magnet has been used and found negative, whether the foreign body is in the eye or in the orbit, another plate is taken, the first 1½ minutes of the exposure with the eye looking fully upwards, and the second 1½ minutes of the exposure with the eye looking fully downwards. If the developed plate now shows two foreign bodies, it is in the eye, if only one, then it is in the orbit.

A fallacy suggests itself here, that is, where the foreign body is in one of the ocular muscles, or in the capsule of Tenon, and it will have moved, but the extent of the movement is slight compared with the extreme deviation and depression of the eyeball."

After experimenting by this method by fixing metal points to the eye, and again taking a skull and fixing an eye in position in the orbit, and placing chips of metal in different parts in the interior of the eyeball, one can become quite proficient, after some practice, at interpreting the developed plate, although I have not been able to say with certainty whether a foreign body is, if located in the anterior part of the eyeball, in the superior-external or superior-internal quadrant, or the inferior-external or inferior-internal quadrant, and similarly if it is in the posterior part of the eyeball, as Boxer suggests.

As I have mentioned previously, for all practical purposes, what a surgeon wants to know is whether the foreign body is inside the eyeball or not, and if in the eyeball, its position, roughly, before applying the magnet.

This method, I have found, fulfils these conditions satisfactorily after a little practice; it is easy to perform; and ten to fifteen minutes will complete the whole operation, including the developing and fixing of the negative.

Mackenzie Davidson localization.—I have used this only in selected cases, as it takes more time, and really requires a person experienced in X-ray work to determine the position of the foreign body accurately—although, like everything else, I daresay one can become proficient with a little experience.

The method I adopted was that described by Maitland Ramsay.[5] For all practical purposes, I would limit its use to the following classes of case: (1) where the X-ray plate, as taken by the first method, suggests that the foreign body is embedded in the sclera, or is outside the eyeball, and where the electro-magnet gives a negative result; (2) where the case is not a recent one.

In this class of case it is well to localize the foreign body before proceeding to use the magnet, because, if the giant magnet is used straight away, without having any definite idea of the position of the foreign body, the removal of the latter may cause considerable damage to the structures of the eye, owing to it having become firmly embedded in fibrous tissue. In a case of this sort, especially where the foreign body is in the vitreous, I think it is better to do a scleral section near to the position of the foreign body, and extract it, either by the small Hirschberg magnet or by the giant magnet (see "Treatment by electro-magnet").

Another instrument which is used to determine the position of the foreign body in the eye is the Sideroscope. Of this instrument I have had no practical knowledge. The principle of the instrument is a magnetic needle to which a small mirror is attached, and which records the movement of the needle on a graduated scale. On bringing a patient's injured eye, with a piece of metal in it, near the needle, the movement of the needle is greatest when nearest the metal, and the greater the size of the metal, the greater will be the swing of the mirror. According to this, one is able to localize the foreign body, although I cannot see how it can be compared favourably with X-ray work as regards accurate localization. It is used more on the Continent than in this country.

(*To be continued.*)

CLINICAL MEMORANDUM.

TINCTURE OF IODINE IN EYEWORK.

BY

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A CASE was mentioned in the *Annales d'Oculistique* of August, 1914 (for abstract see THE OPHTHALMOSCOPE, June, 1915, page 304), where suppurative dacryocystitis and lacrymal fistula was treated by Wessely's method of injecting tincture of iodine through the fistula until a drop or two passed through the punctum into the conjunctival sac. After six such injections had been made, the cornea was found to be stained yellow, and the iris could not be seen. There was considerable pain. Chemosis followed. Complete recovery resulted.

An article by Dr. William J. Rutherford in a recent number of the *British Medical Journal* (May 15th, 1915) describing three cases where excessive reaction followed the local application of tincture of iodine, recalls an experience of my own.

For several years I have employed tincture of iodine to disinfect the skin of the eyelids and neighbouring parts prior to operation upon the eye.* This is usually undertaken as the patient lies upon the operating table, and care is taken to apply the iodine not only to the skin but also to the roots of the eyelashes and along the intermarginal space of both the upper and lower eyelid. Cocaine is usually applied first to the eye, so that the smarting liable to be set up by the iodine is not complained of by the patient. In most cases the application of iodine forms the sole preparation before operation. If circumstances permit, the eye is washed twice or thrice a day for two or three days before the operation with boric lotion or saline, 1·4 per cent. The lids, however, are not covered with any kind of dressing.

Irritation from iodine must be uncommon, inasmuch as Dr. Rutherford met with but three instances among 14,000 patients. Speaking for myself, I may say that with the exception to be mentioned immediately, I have never seen any untoward effect follow application of the iodine.

A gentleman, aged 69 years, consulted me in the early part of 1913 on account of the condition of his left eye, which showed a slight grade of senile ectropion. Ordinary remedies failing to better the condition, it was decided to operate. On March 6th, under the anæsthetic influence of cocaine and adrenaline injected beneath the skin of the lower lid, an incision was made into the intermarginal space, a strip of conjunctiva and tarsus excised, and the raw edge stitched with horse-hair sutures to the edge of the lid. Before the operation, the skin of the eyelids, side of nose, and lower part of the forehead was painted with a 3 per cent. tincture of iodine. The parts were dressed on March 7th, when nothing was seen to be wrong. On the following day, the patient complained of a disturbed night, owing to the discomfort in the lid. On removing the dressing, it was seen that the parts that had been painted with iodine were swollen and of a bright red colour. In fact, at first sight, the case looked almost like one of erysipelas. But no bullæ were present, the redness faded off gradually into the neighbouring skin, and the patient's temperature was not raised. The wound was in a healthy state. The eye was dressed with pure vaseline. A couple of days later (March 10th), the swelling had almost gone, but the skin over the eyebrow was reddish and had a harsh feeling. Seven days after operation the condition had almost subsided, and five days after that the skin was all right.

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*For operations upon the eye the "Vaporole" of iodine tincture, made by Burroughs, Wellcome, and Co., is exceedingly suitable. Each of these little glass receptacles contains twenty minims of a 3 per cent. tincture of iodine. The thin end of the tube is covered with absorbent wool, enclosed in a silken cover. When the thin end of the phial is broken under the cover, the iodine is taken up by the wool, which is then used as the medium for applying the iodine to the parts.

The erythematous dermatitis induced in this patient by tincture of iodine was doubtless due to some idiosyncrasy on his part. As an example of the same kind of thing I may mention a case where preparatory to extraction of senile cataract, the eye and its surroundings were covered the night before operation with a compress damped with sublimate lotion, 1, to 5,000. When the dressing was removed next morning on the operating table, the parts that it had covered were found to be in a state of dermatitis. In due course the patient's second eye came to operation, and warned by the former experience, the eye was simply covered with a compress steeped in boiled water. An erythematous dermatitis, however, was again produced.

REVIEW.

THE INTRA-OCULAR PRESSURE AND THE TENSION OF THE EYE.

(*Concluded.*)

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Part III.

The Relationship of Systemic Blood Pressure to Intra-ocular Pressure.

The consensus of opinion would appear to be that experimental investigation has established the existence of a distinct relationship, under ordinary conditions, between the systemic blood pressure and the intra-ocular pressure. Speaking in general terms, the two may be said to rise and fall together. It would, however, be a very great mistake to suppose that the intra-ocular pressure servilely follows the vagaries of the general blood pressure ; nor would any one, who understands the elements of the physiology of the subject, expect such a sequence of events. It is the more necessary to draw attention to this point, since it at times appears to have been lost sight of. From some communications, one would almost gather that a rise in general systemic pressure must logically be followed by a corresponding rise in intra-ocular pressure. This we know is not the case. It seems necessary, under the circumstances, to remind ourselves of certain elementary facts which will be admitted by all alike.

(1) In studying the arterial pressure in any organ, we must take account, not merely of the state of the arterioles in that organ, but also of that of the arterioles in other and distant areas, *ex. gr.*, a dilatation of the arterioles of

the eye might, if associated with a heavy fall of pressure in the splanchnic area, be accompanied not by a rise, but actually by a fall in intra-ocular pressure.

(2) The capillary pressure, which, after all, is the pressure which most concerns our argument, is much more influenced by changes in the venous than in the arterial pressure, be the organ what it may ; for the ever-varying peripheral resistance of the arterioles has to be reckoned with in the latter case ; whereas no corresponding barrier exists between the capillaries and the veins.

(3) The number of influences at work in affecting the blood pressure is not only very large, but those influences may be very complicated, especially in the sense that they may act selectively on certain organs, altering the *status quo* in them out of all proportion to their action on other parts.

In the light of these principles, it is comparatively easy to understand what otherwise might appear to be contradictory. Take, for instance, the statements made by Casolino, with regard to his recent work on the behaviour of the ocular pressure under the influence of various drugs, which modify the arterial systemic pressure (*Archivio di Ottalmologia*, 21st year, p. 588). The inhalation of nitrite of amyl caused only slight lowering of the arterial pressure, and very marked lowering of the intra-ocular pressure. The first effect of adrenalin was to raise both the arterial and intra-ocular pressures, whilst afterwards the latter fell again. Strophanthus caused a rise in arterial and a fall in endocular pressure ; and so on. Again, Rollet and Curtil found that the instillation of adrenalin, especially in inflamed eyes, produced a surprising fall of endocular pressure. First, Wessely and, later, Roemer and Kochmann found an actual rise in intra-ocular pressure, coincident with the sinking of the systemic blood pressure, under the influence of nitrite of amyl. The leading lesson which such experiments with drugs seems to teach is that the relationship of intra-ocular pressure to blood pressure is a very complicated one, and only to be understood by a most careful study of all the factors which enter into the problem (Wessely, XXXVIII. *Ophth. Cong.* Heidelberg, p. 116. Roemer and Kochmann, *Berlin. Ophth. Gesell.*, November, *Centralbl. f. p. Augenheilkunde*, Bd. XXXVIII., p. 10).

Next, we may take up the influence of advancing age on intra-ocular pressure, and contrary to what might have been expected, we learn that it is apparently negligible. In spite of the fact that the systemic pressure rises in most individuals as life advances, the tension of the eye would appear to show no corresponding alteration. This was first found by Langenhan and Engelmann, and was later confirmed both by Craggs and Taylor, and by Toczyski (THE OPHTHALMOSCOPE, 1913, p. 350, and *Klin. Monatsbl. f. Augenheilkunde*, June, 1912, p. 727). This observation shows most strikingly that in seeking to understand how the pressure is maintained within the eye, we must look far wider than to the blood pressure alone.

From conditions of health we pass to those of disease.—Craggs and Taylor found a number of subjects whose systemic blood pressure (taken at the arm) was between 180 mm. and 208 mm. of Hg., who yet presented a normal ocular tension, and who had no sign or symptom of glaucoma. On the other hand, they observed a number of cases of glaucoma with very high ocular tension (70 mm. to 80 mm. of Hg.), who nevertheless had normal blood pressures for their ages. They sum up " a high arterial tension may in some cases be a powerful causative factor in the production of glaucoma—but it is very far from being a *necessary* factor in its causation." In the same year Lobo, discussing the " inflammatory glaucoma " of hot countries, emphasized the fact that arteriosclerosis does not play an important part in its ætiology. More recently, Fourrière's observations endorse and support those made by Craggs and Taylor. Sattler, too, has not found a higher average blood pressure among the glaucomatous than amongst the non-glaucomatous of of the same age; and he points out that those who are suffering from diseases associated with a high blood pressure are not specially prone to glaucoma; their eye troubles are of another kind, being usually due to local diseases of the walls; nor has he seen glaucomatous attacks which could be directly attributed to an increase of blood pressure during violent muscular exercise. On the contrary, as he points out, the exhaustion and heart failure, which follow over-exertion, mental depression and weakening diseases, *ex. gr.*, influenza, are frequently associated with glaucoma. In a similar connection, Priestley Smith has shown that chronic excess of blood pressure in the larger vessels is no evidence of a similar excess of pressure in the capillaries which secrete the intra-ocular fluid; on the contrary, it is associated with increased resistance in the arterioles, and hence with an insufficient capillary circulation. We know that a rise in venous blood pressure is favoured by a weak or slow heart, and by any factor which obstructs the free return of venous blood, and so favours venous congestion, and the observations and opinions above recorded must be read in the light of this knowledge. It would seem likely that in estimating the importance of the *rôle* played by increased intra-ocular blood pressure in affecting the pressure of the intra-ocular fluid, we must look to the venous and not to the arterial end of the system.

The Relationship between the Intra-ocular Blood Pressure and the Intra-ocular Fluid Pressure outside the Vessels.

In examining a doubtful case for glaucoma, it is a wide-spread practice amongst surgeons to press gently on the eye with the finger, whilst watching the optic disc through an opthalmoscope. This has been dinned into us since our student days. If we do so, and if we gradually increase the pressure which we exert on the eye, we find the following sequence of events—first, the retinal vein at the disc becomes shut up, and it can be seen that the blood has been driven out of it; this does not require more than light pressure, but the amount of force used is quite an appreciable quantity to the finger; one can keep one's finger on the lid, raise it gently so as to lessen the pressure exerted, and observe the vessel refill; or, again, one can increase the pressure and see the vessel again become colourless at its end. Later, as the finger pressure is increased, and at quite an early stage if the eye be glaucomatous, one can see marked pulsation in the retinal vein; whilst, later still, if sufficiently strong pressure be exerted, and especially if the eye be glaucomatous, pulsation is seen in the retinal arteries. From such observations it has been deduced that the pressure of the blood in the trunk of the retinal vein is slightly above the pressure of the intra-ocular fluid in which it lies. So far we would appear to be on firm ground, for if the venous pressure were not above that of the ocular fluid, the vein would be shut up, exactly as it is in the above procedure.

The clinical experiment we have described was duplicated in the laboratory by Prof. Leonard Hill, when "he opened one of the vortex veins in the eye of a cat, allowed the blood to escape from there, and forced Ringer's solution to run into the aqueous, by raising the pressure bottle; the outflow from the vein stopped when the aqueous pressure was raised to the arterial pressure." He was carrying out under laboratory conditions the same experiment which we surgeons use in our practice, except that he pushed it further than we do, *viz.*, to the stoppage of all circulation, whereas we are content to stop with the production of the arterial pulse (*i.e.*, at diastolic arterial pressure) or even earlier.

It has been assumed by some that the pressure in all the veins leaving the eye must be the same at their point of exit. If this were certainly correct, it would be of interest, since we can, as above shown, form some estimate of the relationship between the intra-ocular pressure and the blood pressure in the proximal part of the retinal vein. The matter is probably not of very great moment, but it is as well to bear in mind that the assumption may not be absolutely correct. Speaking in general terms, we know that as the blood passes from the smaller to the larger veins in its flow towards the heart, the pressure steadily falls, and that "the larger the vessel the lower the blood pressure" is a good general rule. The large size of the canal of Schlemm relatively to the retinal vein, would suggest that the pressure within the former vessel may be lower than that in the latter. The same remark applies to the vasa vorticosa. At first sight this suggestion seems to open up very attractive possibilities, for if we assume that the pressure in the canal of Schlemm is lower than that in the retinal vein, we can explain to ourselves the method of escape of the intra-ocular fluid into that canal. We might argue thus: The pressure in the retinal vein being a little higher than that of the intra-ocular fluid, the vein is kept patent, and its contents can escape; again, the pressure in the intra-ocular fluid being a little higher than that in the comparatively large canal of Schlemm, the drainage of fluid into that canal from the interior of the eye is quite simply explained. Unfortunately, we are here confronted with a grave difficulty, for if the pressure in the canal of Schlemm is less than that in the anterior chamber, it would appear likely that the canal must promptly be closed by pressure from without. It was formerly assumed that a special mechanical arrangement prevented such a closure, but that idea has been challenged.

We may put the question thus.—If we are to assume that the intra-ocular fluid escapes from the eye under pressure by a process of filtration, the necessary corollaries of this assumption must be that the pressure of that fluid is slightly higher than the pressure for the time being in the canal of Schlemm, and that some mechanical arrangement saves the walls of that canal from collapse. To assume that the pressure in the canal is equal to that of the intra-ocular fluid is impossible, for under such circumstances, no flow of fluid would take place. It is an elementary law that an equality of pressure can lead only to stagnation. The condition is one which is illustrated for us in every day life, when an over-filled basin empties down to the level of its waste pipe, and then stands steadily at that level until more fluid is added, or until a fresh method of exit is provided for the fluid present. If, however, we follow what appears to be the present tendency, and reject the idea that the walls of the canal of Schlemm can be held open in spite of pressure from without, we are driven to adopt the view that osmosis plays an important part in the process, and that the intra-ocular fluid is *sucked* into the canal and into the iris veins. If this be the explanation, then an equality of pressure inside and outside the canal would be unimportant; indeed, the fluid might even easily be drawn into the canal against the push of a higher pressure in the latter. Mr. Priestley Smith has been so exceedingly kind as to inform the writer that he has adopted the latter view, and that he will shortly set forth his reasons for so doing. It is needless to say that he has gone into the question with his accustomed thoroughness, and has thought out and met the various objections likely to be raised to the idea.

Starling has shown, elsewhere in the body, that provided a vein is sufficiently thin-walled, fluid will readily pass into it from the tissues; and that this exchange may take place against the push of a higher pressure in the vessel, for it is due to osmotic action. His work is thus in strong support of the view we are discussing.

We have to some extent been prepared to accept the idea that the escape of the intra-ocular fluid is due to osmosis, by the researches which have been carried out during recent years by a number of observers. A very short review of this work will therefore be germane to the discussion. According to Roemer, the subconjunctival injection of fluid in the eyes of dogs led to a rise in tension. He explained this on the supposition that the fluid found its way into the anterior chamber, and there produced alterations in the osmotic and chemical state of the vessels within the eye. Craggs found that in man the influence of subconjunctival injections of normal saline solution was very uncertain, and that in some cases the injections were followed by a rise in tension, as measured by a Schiötz tonometer. Verderame supported Roemer's findings, but went farther and showed that the more concentrated the fluid injected and the greater its bulk, the more distinct was the rise of tension observed in the eye. Others have recorded similar observations. Roemer's suggestion that the saline injection fluid finds its way into the anterior chamber is sanctioned by what we know of the behaviour of drugs, such as cocaine, when solutions of them are subconjunctivally injected.

Hertel's work, though closely allied to the above, attacked the problem from a different standpoint, since he injected certain soluble substances, *ex. gr.*, glucose and sodium salts, into the blood current of men and animals, or else administered them in large doses by the mouth. The effect in either case was a fall in intra-ocular pressure, which he satisfied himself was not due to a fall in the general blood-pressure. He attributed it to the osmotic abstraction of water from the interior of the eye, brought about by the high concentration of the active substance in the blood. He found that the normal tension returned to the eye with the re-adjustment of the concentration of the blood, and that this return could be hastened by the injection of isotonic or hypotonic saline solutions. Moreover, he found that a distinct though transitory fall in intra-ocular pressure could be brought about in the glaucomatous eyes of men and animals by the injection into the blood stream of concentrated saline solutions. Sattler spread the *ægis* of his clinical opinion over these experiments, whilst uttering a warning that such treatment might not be free of risk. Closely allied to Hertel's work was that of Tristaino, who, moved thereto by the clinical experience of Weekers, experimented on rabbits in order to ascertain the power of intravenous injections of a solution of chloride of calcium in reducing ocular tension. His experiments are the more interesting in that they go far to confirm Verderame's findings, for he discovered that the rapidity, the intensity, and the duration of the effect produced were all proportional to the amount of the drug administered, and to the frequency of its administration.

It might be unwise to strain the lessons to be learnt from this mass of interesting work, but it seems probable that we can make the following tentative deductions :—(1) that the therapeutic over-loading of the blood with certain soluble substances, is capable of producing such a change in the osmotic relationship between it and the intra-ocular fluid, that a fall in the intra-ocular pressure is thereby brought about, and (2) that a converse therapeutic change, which enhances the saline contents of the intra-ocular fluid as compared with those of the blood, may be a factor in bringing about a rise in the intra-ocular pressure.

It must be admitted that the grounds for the second deduction are not quite so satisfactory as those for the first.

We thus open up fields of enquiry both as to the possible influence of pathological alterations in the osmotic behaviour towards each other of the blood and intra-ocular fluid, and also as to the conditions under which the normal escape of fluid takes place from the cavities of the eye into the blood vessels.

To summarise our conclusions :—

(1) It is essential to bear in mind, that in dealing with the physical conditions governing the behaviour of the intra-ocular fluid, as it passes into and out of the eye, we have to do with a body of *moving water*, and that the laws to which we must appeal are those of hydro-dynamics, and not those of hydro-statics.

(2) The question whether the intra-ocular fluid is poured out by an act of secretion, or by a process of pressure filtration, is still *sub judice*. Probably the action is a combined one, pressure and secretory activity each taking a part therein. Fortunately, the interest involved is academic, rather than practical.

(3) The systemic blood pressure tends, as it rises and falls, to exert a corresponding influence upon the intra-ocular blood pressure. This influence may, however, be masked or even counteracted by the action of a number of other factors.

(4) The venous exit pressure throughout the eye is probably always a little in excess of the intra-ocular pressure.

(5) Whilst admitting that there are difficulties on all hands, the most probable explanation of the method by which the intra-ocular fluid finds its way into the canal of Schlemm and into the iris veins, is that the action is osmotic in nature.

[THE END.]

TRANSLATION.

RESTORATION OF THE SUPERCILIARY ARCHES BY MEANS OF AUTOTRANSPLANTATION OF BONE.*

(Réfection des arcades sourcilières par autotransplantation osseuses.)

BY

DR. JEAN JIANO,

OF BUCHAREST.

THE case in question was that of a little girl, aged 5 years, who had as a peculiarity an under-development of the superciliary arches and of the bony parts of the nose, which produced a Mongolian type of facies with much reduced palpebral fissures and bilateral epicanthus.

After correction of the epicanthal folds by extirpation of an elliptical cutaneous flap from the root of the nose, I reproduced the prominence of the eyebrows by means of a bony auto-graft.

Chloroform anæsthesia was employed. Through a median incision in the direction of the pyramidal muscles, I made, by means of a raspatory, two

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*From *La Clinique Ophtalmologique*, septembre, 1914.

transverse tunnels between the bone and the periosteum at the eyebrow level. Through an incision in the right leg, I laid bare the crest of the tibia and prepared two fragments of this about three centimetres long, two centimetres broad and half a centimetre thick. I bent up these fragments and introduced them into the spaces between the bone and periosteum, the cut surfaces being placed next the periosteum. The cutaneous incision was sutured intradermically.

Three months later, there was an excellent result.

As a consequence of the superciliary relief which had been obtained, the eyelids had taken a higher position, and the palpebral fissures were wide enough not to interfere with vision. The eyeballs were well protected by the new superciliary arches. ERNEST THOMSON.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—PHYSIOLOGY.

(1) **Pignatari.—A study of the difference between the two eyes in the valuation of colour of microscopic preparations. (Di una differenza esistente fra i due occhi nel valutare la colorazione dei preparati microscopici.)** *Rivista Italiana di Ottalmologia*, Aug., 1911.

(2) **Wessely, K.—On experimentally induced compensatory hypertrophy of the ciliary body. (Ueber experimentell erzeugte kompensatorische Hypertrophie der Ziliarfortsätze.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1912, p. 98.

(3) **Campos.—A contribution to the study of physiological diplopia. (Contribution à l'étude de la diplopie physiologique.)** *Ann. d'Oculistique*, janvier, 1912.

(4) **v. Fürth, O. and Hunke, V.—Studies upon distention phenomena in the eye. (Studien über Quellungsvorgänge am Auge.)** *Zeitschrift für Augenheilkunde*, March and April, 1913.

(5) **Dransart and Vanhoutte.—Notes on the fusion power of the ocular muscles. (Notes sur la force de fusion des muscles oculaires.)** *l'Ophtalmologie Provinciale*, juin, 1913.

(6) **Sgrosso, Salvatore.—Neuroparalytic keratitis and other alterations of the ocular tissues, following section of the trigeminal nerve within the skull. (Della keratite neuroparalitica e di altre alterazioni dei tessuti oculari che si avverano per effetto della sezione intracranica del trigemino.)** *Archivio di Ottalmologia*, Novembre-Dicembre, 1913.

(7) **Gutmann, A. — Physiological researches upon the alteration in position of the eyeball in the orbit. (Physiologische Untersuchungen über Lageveränderungen des Bulbus in der Orbita.)** *Zeitschrift für Augenheilkunde*, February, 1914.

(1) Weakness of the colour sense, partial or total colour-blindness, has been the subject of much study. Unilateral defects have been rarely observed,

and any gross defect confined to one side is very uncommon. It is not difficult to find, if we examine carefully, certain differences in the perception of colour as between the two eyes which do not amount to colour blindness. Charpentier has noted that if an eye be withdrawn from the light for a short time, it becomes more sensitive, not only to ordinary light, but to monochromatic light also. He attributes this difference to the increased sensitiveness to light.

Professor Gallenga called **Pignatari's** attention to the fact that he, Gallenga, had from the first noticed a decided difference in the appearance of microscopic objects according as to whether he observed them with the right eye or the left, not only in respect to the clearness of outline, but also in the luminosity and distinctness of the colour, although the acuity of vision and the refraction were the same for the two eyes.

Pignatari has made many experiments on this point, and has found it constant that he sees colour better with the left eye than the right, while form is better seen with the right eye. He then examined the vision of others, and obtained for the most part similar results. To interpret this diverse sensation between the eyes, an experiment made by Gallenga must be taken into consideration: he interposed, at the moment when the right eye was exchanged at the microscope for the left, a glass coloured with cobalt between the reflector and the object. He noticed that the left eye then saw details more clearly, but colour less clearly, than before.

The explanation given by Pignatari is that the two eyes have a different sense of luminosity; with excessive illumination, the left eye becomes exhausted sooner than the right, and therefore colours appear to it less saturated, brighter, and mixed with a greater quantity of white light.

HAROLD GRIMSDALE.

(2) **Wessely**, of Wurzburg, gave an account of experiments he had made upon the action of bile upon the eyes of rabbits. When a strong solution of bile or bile salts was injected into the vitreous, it caused severe inflammation, the lens became cataractous, the vitreous shrank, and the retina and choroid became fused together into a dense fibrous mass. Ultimately, complete phthisis of the posterior part of the globe ensued. The ciliary body and the iris did not participate in this inflammation, but the ciliary body became greatly hypertrophied and continued to fulfil its functions. Although the anterior chamber was much deeper than normal and held much more aqueous, it was refilled after paracentesis as rapidly as the other eye, which was used as a control. Wessely notices other experiments of his own and some made by Deutschmann regarding the effect of removing the whole iris and ciliary body. In birds a compensatory hypertrophy of the pecten follows. He deduces the conclusion that the choroid and pecten have a share in the production of the intra-ocular fluid, and that, in consequence, when the choroid is destroyed, the ciliary body has to undertake the whole supply and hypertrophies.

T. HARRISON BUTLER.

(3) **Campos** considers that physiological diplopia is due to projection of the images towards the plane of fixation and that the images are not virtual and subjective, as maintained by Parinaud, but real and objective.

R. J. COULTER.

(4) Ever since Martin Fischer showed that if an enucleated eye were placed in acidulated water, it swelled until the internal tension became so great that the sclera might rupture, the subject has had great interest for ophthalmologists, many of whom have repeated and developed his experiments.*

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*For an abstract of Fischer's work, see THE OPHTHALMOSCOPE, 1912, p. 712.

The latest research, written by **v. Fürth** and **Hunke**, of Vienna, lies before us. They have carried out a series of experiments which are more exact and refined than those hitherto made, and have concluded that Rubers is correct in ascribing the distension of the eye not to absorption of fluid by the vitreous, but by the sclera, which becomes enormously thickened, so reducing the internal capacity of the globe. The vitreous does absorb a little fluid, but the effect is minimal. They found that isolated strips of sclera placed in acid water became shorter and thicker. They have not been able to confirm Fischer's statement that injection of salts in solution, such as sodium citrate, can exert a favourable effect upon glaucoma. This opinion agrees with that which has been expressed by many other ophthalmic surgeons. T. HARRISON BUTLER.

(5) In these notes **Dransart** and **Vanhoutte** endeavour to prove, from the statistics of a large number of cases, that the cause of miners' nystagmus and of certain other conditions is insufficient fusion power. The insufficiency often shows itself as asthenopia, when the internal recti are affected; this may go on to crossed diplopia in bad cases. The authors quote Ohm and Simeon Snell in support of their theory in relation to miners' nystagmus.

They estimated the fusion power of the ocular muscles by means of prisms in more than 400 cases. In the case of the internal recti their results show an average of eight and a maximum of thirty-six; with the external recti an average of five and a maximum of ten; with the superior and inferior recti an average of two and a maximum of five. They were thus able to produce a formula for the fusion power of the normal ocular muscles. The average for all the muscles was seventeen, and the formula is represented by F=8—5—2—2. In miner's nystagmus the formula is F 5—3—1—1 10.

They infer that in this disease all the ocular muscles are in a state of paresis. P. A. HARRY.

(6) As a result of his observations on animals, **Sgrosso**, of Naples, comes to certain conclusions.—Within forty-eight hours of the section of the fifth, we find changes beginning with necrosis and desquamation of the epithelium, especially in the part in which nutrition is worst; that is to say, in the centre. If the changes start occasionally in the paracentral zone, they spread very rapidly to the centre. The substantia propria manifests similar changes, as is shown by the turbid aspect and diffuse staining of the corneal lamellæ, and the pale colour of the elements of the cornea. At the same time changes are to be seen in the ciliary region, where the processes are swollen and somewhat deformed. In some sections the ciliary epithelium is normal, but often it is broken up or even altogether wanting. The vessels are dilated, and there is evidence of a perivascular œdema. In a second stage, we find the loss of substance of the cornea assuming the aspect of a superficial ulcer. The edges are marked by epithelium, in part hyperplastic, and in part necrotic; the corneal tissue up to a certain depth, is richly vascularised and infiltrated with polynucleated leucocytes and fibroblasts, so that, on the whole, the appearance is that of new-formed scar tissue with many new vessels. It is probable that this enormous infiltration is due to the positive chemotaxis exercised either by the already necrotic cells or by those in the process of destruction. This, however, will not explain the eosinophilia which is a marked feature, and Sgrosso imagines a special affinity of the products of the breaking-down for the eosinophils. During this second stage we see a progressive atrophy of the ciliary body. Later, there follows a stage of repair.

Sgrosso goes on to discuss the various theories of the nature of the processes. He is convinced that Snellen's traumatic theory is insufficient to account for the whole, since the changes are observed in eyes which have been kept closed, and therefore immune from injury from the first, although these changes are somewhat slower in their development. Nor does he think Claude Bernard more logical; his theory would demand a vasodilatation, as a result of a lesion of the sympathetic fibres running with the fifth, and as a matter of fact this vasodilatation is not observed. He rejects also the bacterial theory, because he has not been able to find any pathological bacteria in the corneal tissue, and because the eyes of his experimental animals were kept protected from infection. He upholds the hypothesis of Angelucci, that the changes are due to an alteration of the osmotic functions produced by an alteration of the vessel walls, and by their insensibility.

HAROLD GRIMSDALE.

(7) **Gutmann,** of Berlin, has carried out a laborious research upon the alteration of position in the orbit of the eye induced by various weights placed upon the cornea. The subject has no very obvious practical significance, and the method employed is so unscientific that the results tabulated can have no real value. An instrument, shaped like a Schiötz tonometer, was used. This is placed upon the cornea, and the hand which holds it moved till the pointer registers zero. An assistant now places a weight upon the tray which presses in the eye, and the pointer gives a fresh reading. But the slighest movement of the supporting hand would alter this reading without the addition of a weight, so the value obtained must depend entirely upon a personal equation, and can have no absolute value.

T. HARRISON BUTLER.

II.—OPHTHALMOLOGY AND GENERAL MEDICINE.

(*Fifth Notice.*)

(1) **Holmes, Gordon.—The diagnosis of tabes dorsalis.** *Brit. Med. Jour.*, March 14th, 1914.

(2) **Batten, F. E. and Mayou, M. S.—Family cerebral degeneration with macular changes.** *Proceedings Royal Society of Medicine: Section of Ophthalmology*, March, 1915.

(1) **Holmes,** of London, devotes his article, not to an account of the cardinal symptoms of tabes dorsalis, but to certain practical signs, which are as simple to elicit as their diagnostic value is great.

Disturbances of sensation are the most significant and valuable of the physical signs of tabes. With regard to "lightning pains," their irregular incidence, their momentary duration, and their intense sharp or burning nature, together with the soreness and stiffness they leave behind, are all most significant and, in fact, almost characteristic of the disease. Mistakes, however, are not infrequent, mainly because physician and patient do not always attach the same meaning to the expression "lightning pains." But the common girdle sensations or persistent or intermittent local thoracic or abdominal pains are even more often sources of error than the pains in the limbs. They have not seldom led to operations of one kind or another, which might have been avoided by the expenditure of a little care in taking the patient's history and time in making a fuller examination. It is the sensory disturbances, of which the patient is often unaware, that afford the most valuable signs of tabes. They must be specially searched for. The easiest to investigate is analgesia. The earliest loss of sensibility to pin-prick is usually found on the lower limbs, and at first is but partial. Patients, even in the so-called "preataxic stage," not uncommonly experience no discomfort from a pin-prick on any part of the lower limbs. Before this stage is reached, certain anomalies of sensation to pain are often present, as follows: (1) delay in the perception of pain; (2) abnormal sensations following the prick, as "burning," or "tingling," and (3) persistence of the pain, so that a patient may even try to "rub the feeling away." A common manifestation is an analgesic or hypalgesic zone around the thorax, the upper margin of which usually lies at the level of the second rib in front. In about 70 per cent. of the cases Holmes has found some loss of sensibility to pin-prick on an irregular and indefinite area in the centre of the face, especially on the nose and the neighbouring portion of the cheeks. The sign is a valuable one, as it may occur very early in the disease. The diminution, loss, or alteration of sensibility to pin-prick is frequently present when the knee-jerks and the pupillary reactions are normal, and before ataxia or other prominent symptoms have developed. It is consequently, as the author says, the most important phenomenon in the diagnosis of the disease. Deep analgesia, not limited to the somatic structures, is characteristic of tabes dorsalis. Disturbances of tactile sensibility form an integral part of tabes, but they are not so significant as analgesia. The sense of position should always be investigated in cases of suspected tabes dorsalis. Romberg's sign is a rough method of estimating its affection in the lower limbs and at the hips.

Holmes, speaking of the reflexes in tabes, does not attach the diagnostic importance to the disappearance of the deep reflexes that he does to some other symptoms. Moreover, the deep reflexes can be elicited in a considerable proportion of early cases, and, for that matter, in certain cases they are actually exaggerated, owing perhaps to the coincidence of syphilitic spinal lesions or a meningitis.

The Argyll Robertson sign is extremely common and very characteristic of tabes dorsalis, but it is often absent in relatively advanced cases, and the disturbance of the light reaction is occasionally not typical. Loss of the consensual reflex seems to be often the first sign of any anomaly in the reaction of the pupils. The latter, although they may retain their contraction with convergence, may react more slowly or less completely than normal—a kind of modified Argyll Robertson sign. In tabes the pupils are often small, but not always so, and they are frequently unequal in size and irregular in outline, although this is usually regarded as more significant of general paralysis. It should be borne in mind that the Argyll Robertson pupil may be met with not only in tabes dorsalis and general paralysis, but also in cerebro-spinal syphilis and (more rarely) in syphilis of the neighbourhood of the upper end of the mid-brain. Slight ptosis is common in tabes dorsalis. Inasmuch as isolated ocular palsies present no special feature suggestive of tabes, their recognition may cause considerable difficulty. Tabes should always be suspected when a patient complains of a slowly progessive blindness, if the loss of sight is not due to a central scotoma, and, finally, if ophthalmoscopic examination reveals the appearances of a primary optic atrophy.

It is now generally admitted that tabes dorsalis is a post-syphilitic disease, although a positive Wassermann can be obtained from the blood serum in from only 60 per cent. to 75 per cent. of the cases. But when the cerebro-spinal fluid is tested quantitatively to the Wassermann reaction, a positive reaction is obtained almost constantly, as first shown by Hauptmann. Lymphocytosis of the cerebro-spinal fluid, together with increase of the globulin content, occurs in tabes, general paralysis, and in some cases of cerebro-spinal syphilis.

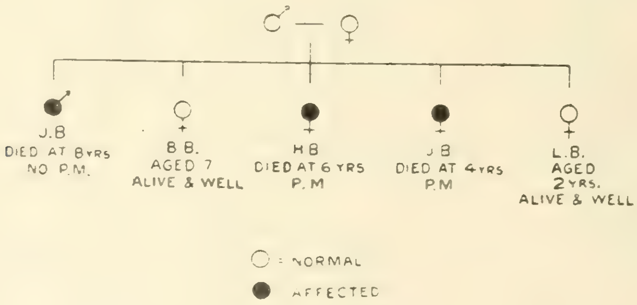
The summary of this practical communication may be given in Holmes' own words:—"We may therefore conclude that the characteristic subjective and objectively demonstrable disturbances of sensation are usually the earliest, the most important and the most unequivocal clinical signs of tabes dorsalis; that they are frequently associated with loss of certain of the deep reflexes, especially of the ankle-jerks and knee-jerks, and with pupillary, ocular and other less frequent symptoms and physical signs; and that modern serological, cytological and chemical methods can supplement and confirm the clinical diagnosis based on these clinical signs, and make the positive or negative diagnosis of tabes dorsalis as certain as anything can be certain in clinical medicine." SYDNEY STEPHENSON.

(2) An important communication by **F. E. Batten** and **M. S. Mayou**, of London, describing the pathology of the eyes and the central nervous system in a couple of cases of "Family cerebral degeneration with macular change."

In this affection, of which the first cases were described by R. D. Batten in 1897, there is an aggregation of fine stippled pigment at the macula, pallor of the optic discs, and a failure of mental power, usually beginning at the age of six or seven years. It is essentially a family affection, and on that account was called by Oatman (see THE OPHTHALMOSCOPE, 1911, p. 852), "Maculo-cerebral degeneration (familial)."

Clinical Description.

The family described by Batten and Mayou (*see* chart) consisted of five members, namely, one male and four females, born of healthy, non-Jewish parents.



The only boy suffered when aged 3 years and 10 months from an affection thought to be in the nature of traumatic epilepsy, and was trephined without appreciable effect upon the symptoms present. He passed into a demented condition, and finally died at 8 years of age. No *post-mortem* examination was made. The eldest of the four girls, aged 7 years, is normal from a physical and mental standpoint. The second girl (Hilda B.) developed "fits" when aged 3½ years, and later became mentally defective. The optic discs were pale, but at that time no other changes could be seen in the fundus oculi. Some eight months afterwards, however, she took no notice of things, the optic atrophy was more pronounced, and there were pigmentary disturbances in the macula region, as well as in the periphery of the fundus. She died when aged 6 years. The *post-mortem* examination showed a normally convoluted brain, with shrunken convolutions. The third girl (Jessie B.) was apparently normal until she reached the age of

3 years, when "fits" occurred and she began to show marked mental defect. The optic discs and fundi were normal. The child contracted chicken-pox, and died when aged 4 years. The *post-mortem* examination showed a normally convoluted brain, with but little shrinking. The youngest girl, aged 2½ years, is alive and well. The eyes are normal.

There is nothing to suggest syphilis in the family, and in the two cases where it was tried (Hilda and Jessie), the Wassermann reaction both of the blood and the cerebro-spinal fluid has yielded negative results.

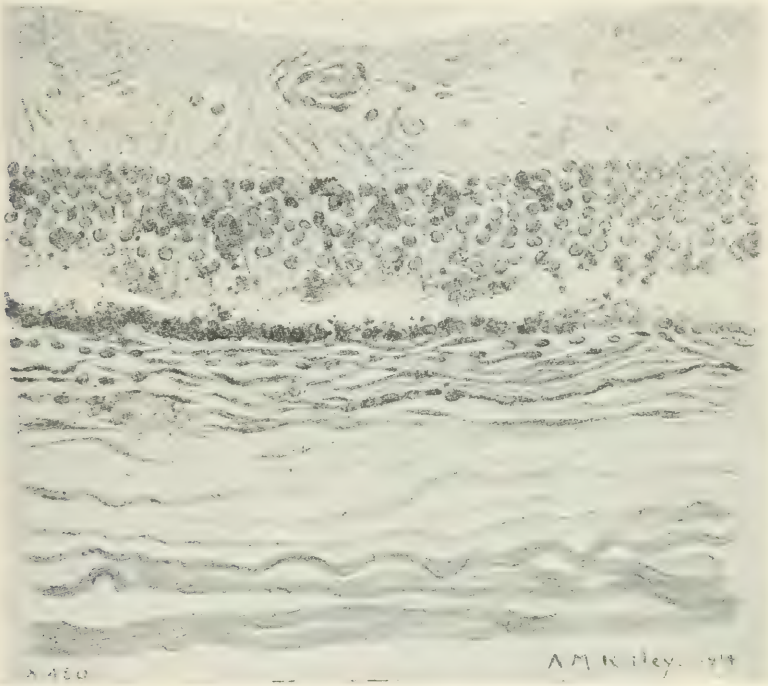


FIG. 1.—Cerebral degeneration associated with macular changes. The retina shows the extreme stage of the retinal degeneration. 1, disappearance of the ganglion cells, with thickening and proliferation of the nuclei of the inner layers of the retina; 2, disappearance of the inner nuclear layer and of the rods and cones; 3, migration of the retinal pigment.

Briefly, then, in a family of five children, three were affected towards the age of 3½ years with a progressive disorder leading to dementia, blindness, and paralysis. The failure of sight occurred before the macular change developed. Death ensued in one child at the age of eight, in a second at the age of four, and in a third at the age of six years. In two of the cases a *post-mortem* examination was made.

Pathological description.

(*a*) Hilda B.—The changes in the eyes were limited to the retina. They included disappearance of the neural elements, together with slight proliferation of the supporting structures of the retina. The chief changes were in the macular region and also in some situations in the periphery. Where degeneration was most pronounced, the inner nuclear layer, ganglion cells, and rods and cones had completely disappeared. In the nerve-fibre layer and in the position of the ganglion cells, the retina was somewhat thickened and there was an increased number of darkly staining nuclei. In the retinal pigment layer the pigment had migrated from the cells to a slight extent into the outermost layers of the retina. The retinal changes are summed up by saying that there is a disappearance of the neural elements starting first with the ganglion cells and ending with the inner nuclear layer and rods and cones, all of which is accompanied with a slight increase in the proliferation of the supporting structures with their nuclei. Where the change is extreme, there is a tendency for pigment to migrate from the pigment cell layer. It is shown by description of a typical case that there is a close relationship between the pathological appearances of family cerebral degeneration, on the one hand, and amaurotic family dementia, on the other.

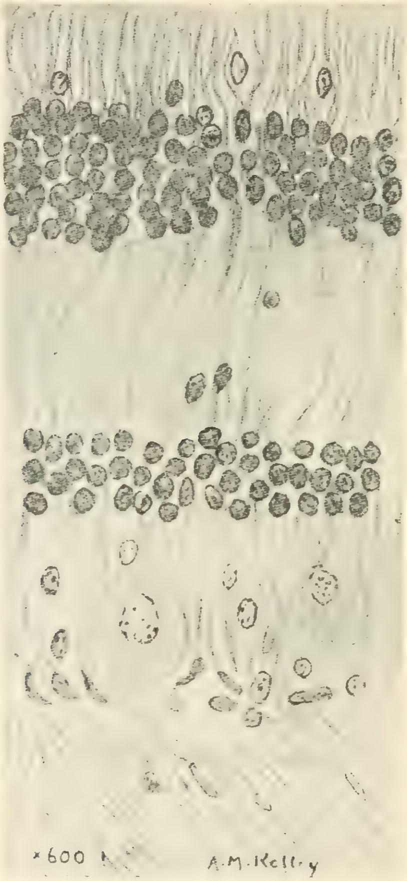


FIG. 2.—Cerebral degeneration associated with macular changes. Retina showing early signs of degeneration—œdema of the intranuclear layer and changes in the ganglion cells.

As regards the pathological condition of the central nervous system, the outstanding feature was the marked degree of disintegration of the cells, not accompanied by any marked degeneration of the tracts. In the cerebrum, the degenerative process was seen most strikingly in the Betz and large pyramidal cells, which had assumed more or less of a globular form, with the nucleus displaced, usually towards the apex of the cell. The Nissl substance was disorganised. In the early stages, the protoplasmic network became very coarse and simplified in design. The fibrils were seen to enter the cell from the dendrites, and then after disappearing in the swollen body of the cell, to come into view again at the point of emergence of axon. Few of the cells of Purkinje in the cerebellum could be regarded as of normal structure. The cell bodies were usually swollen, the nucleus displaced, and the protoplasm diffusely granular. The dendrites were apt to be swollen, and to show globular swellings. Globular swellings were in many instances present upon the axons. Other morbid changes in the cerebellum included paucity of the white matter, absence of the basket arrangement of fibres around the cells of Purkinje, degeneration of the cells of the dentate nucleus, and reduction of the cells of the granular layer to about one-third of its normal depth. The cells of the pons, medulla, and cord showed more or less degeneration, together with general swelling, displacement of the nucleus, and chromatolysis. It was rare to come across a cell of normal appearance.

(*b*) Jessie B.—The microscopical examination of the central nervous system was carried out by the Weigert-Pal, Marchi, Nissl, van Gieson, and Bielschowsky methods. By the first-named method, the cerebellum showed some diminution of the medullated fibres. No abnormality was to be seen in the spinal cord. Sections of the optic chiasma and the optic nerve revealed but little change. By the Marchi method, sections of the cerebral cortex showed degeneration in the fibres of the white matter, but little in the grey matter. Degeneration from the precentral nucleus gyrus could be traced into the medulla and spinal cord. In the cerebellum degeneration in fibres in the pyramidal tract, in the transverse fibres, and in the intramedullary portion of the cranial nerves. In the cervical, dorsal, and lumbar region of the spinal cord there was diffuse degeneration in the pyramidal tract, the antero-lateral tract, and the posterior column. The Nissl and van Gieson methods showed marked changes in the pyramidal and Betz cells, which were scanty and degenerate. The Purkinje cells of the cerebellum were diminished in number, had lost their dendritic process, and were swollen and vacuolated. A layer of large granular cells was a marked feature in the region of the Purkinje cells. The cells of the ventral horn of the spinal cord were numerous and showed changes.

Conclusions.

The authors' conclusions may be quoted textually, as follows :—

" It is clear from a consideration of the above cases and their pathology that there is a group of cases similar to the Tay-Sachs' family amaurotic idiocy, but occurring at a later age and not race selective. The disease is characterised by progressive blindness, progressive paralysis, and progressive dementia ; but the changes at the macula are not always present, and when present are in some cases a late manifestation, in others an early manifestation of the disease.

The later in life the disease appears the less acute seems to be the course, and in those cases in which the visual defect manifests itself during or after the second decade of life, there appears to be little or no liability for the central nervous system to be affected. The parallelism of the clinical symptoms with the Tay-Sachs' cases is clear. The agreement lies in (1) the familial character ; (2) the absence of syphilis ; (3) the clinical symptoms and course. The difference lies in (1) the absence of race proclivity; (2) the absence of the characteristic macular change; (3) the difference of age."

"What the nature of the poison may be which is so selective in its mode of action and tends to affect several members of a childship, is a problem yet to be solved, for neither the exhaustion theory of Edinger, nor the abiotrophy theory of Gowers helps to throw light on the condition."

SYDNEY STEPHENSON.

III.—THE SCOTOMA OF MIGRAINE.

(1) **Edridge-Green, F. W.—The scotoma of migraine.** *Lancet*, April 24th, 1915.

(2) **Higgens, Charles.—The scotoma of migraine.** *Ibidem*, May 1st, 1915.

(3) **Edridge-Green, F. W.—The scotoma of migraine.** *Ibidem*, May 8th, 1915.

(1, 2, and 3) The annotations by **Edridge-Green** and **Charles Higgens**, of London, seem impossible to abstract as a whole. The following fact, however, stated by Edridge-Green in his second communication, is so remarkable that it may be transcribed, in order that it may be verified by others.

"A simple experiment, which proves conclusively that the photo-chemical stimulus is external to the cones, may be made as follows.—On arising in the morning arrange a mirror so that the sun is reflected from its surface, then whilst one eye is closed and covered with the hand the other eye is opened and closed so that the image of the sun is visible for a fraction of a second; both eyes being now closed and covered with the hands a clear cut after-image of the sun is seen on a dark background. It will be noticed that there is nothing else visible in the field of vision. If the head be now moved rather sharply to one side the after-image will be drawn out into a long sausage-shaped form with irregular knobs on it. If the head be sharply jerked we can obtain several after-images, plainly showing that the photo-chemical stimulus is movable in the retina, and therefore cannot be situated in the cones."

Edridge-Green states that while many older men fail to see various subjective phenomena, these are rarely missed by the young.

ERNEST THOMSON.

IV.—PATHOLOGY.

(*Third Notice.*)

Tumours of the Lacrymal Gland.

(1) **Knapp, George, H.—A mixed tumour of the lacrymal gland.** *Archives of Ophthalmology*, January, 1911.

(2) **de Lapersonne.—Mixed tumour of the accessory lacrymal gland. (Tumeur mixte de la glande lacrymale accessoire.)** *Archives d'Ophtalmologie*, juillet, 1912.

(3) **Wray, Charles.**—**Endothelioma of the lacrymal gland.** *Transactions Ophthalmological Society U.K.*, Vol. XXXIII, 1913.

(4) **Greeves, R. A.**—**Primary new growths of the lacrymal gland.** *Royal London Ophthalmic Hospital Reports*, January, 1914.

(1) The patient, a man of 46 years, had noticed a tumour in the lacrymal gland region for years; during a few years it had become increasingly prominent and had annoyed him by pressure on the globe, and by causing drooping of the lid. Removal of the growth was followed by prompt healing. The pathological examination leads Knapp to designate it a "mixed tumour" without further description. ROSA FORD.

(2) **de Lapersonne**, of Paris, describes an interesting tumour in connection with the accessory lacrymal gland, in a man of 36 years.

For seven or eight years a small swelling had been noted at the external angle of the right eye, and had increased slowly but painlessly. There were no personal antecedents of importance.

On examination, the tumour, the size of a small almond, was seen to be situated a little above the external canthus, apparently wedged in between the globe and the outer wall of the orbit, but quite free from the orbital gland, which could be felt in its fossa. It was only slightly movable on its deep attachments, but the overlying skin was quite free. Slight conjunctival redness of the superior cul-de-sac was present, but in no way had the tumour interfered with the globe, which was normal in its visual capacity and in movement.

The tumour, of hard consistence, was easily removed under chloroform.

A macroscopic section gave the white slightly lobular appearance of an encapsuled fibroma or fibro-sarcoma. Microscopically (hæmatoxylin and eosine, van Gieson, also Weigert and orcein), the tumour was seen to be surrounded with a thin capsule without cellular infiltration, from the deep surface of which were given off cellulo-vascular bands which divided the mass into lobules or nodules of varying size. The dissimilarity in the structure of these nodules was striking. The central one was undoubtedly the accessory lacrymal gland which had been englobed in the tumour. Its lobules were dissociated, but its elements were unaltered and showed no signs of degeneration. The structure of the surrounding nodules varied, but, in general, they were formed of myxomatous tissue with star figures and hyaline cartilage with cartilage cells. No bony elements were observed. The mucous and cartilaginous areas were invaded by special formations best described as "pseudo-glandular." They contained many cavities ot varying size and shape, filled with a coagulum and lined with one, generally two, and in some three layers of cells, flattened, cubical, and polygonal. The trabeculæ running from the periphery were composed of somewhat dense tissue, poor in vessels but crammed with cells of polymorphous type, some small with large nuclei and little protoplasm, others large with much protoplasm, none showing a tendency to karyokinesis. The rich network of elastic tissue present in many similar tumours was not observed.

The author regards the tumour as being a true mixed one, analogous to those of the parotid, salivary, and like glands. In the orbit they are rare, only two others having been recorded, namely, by Mendez and van Duyse respectively. The special points on which emphasis is laid in de Lapersonne's case are:—

1. The regular disposition of the nodules, surrounded by rather dense partitions.

2. The maintenance of the integrity of the structural elements of the

included accessory gland, notwithstanding its marked degree of dissociation.

3. That the pseudo-glandular cavities were lined with cells, which have secreted a coagulum, thus indicating their epithelial origin.

4. That the abundance of the epithelial elements found in the internodular tissue, and infiltrating the bundles, would appear to indicate that the tumour presents a certain degree of malignity.

In conclusion, de Lapersonne is of opinion that the situation of these mixed tumours at the external angle of the eye is fresh evidence in favour of the inclusion at the situation of the embryonic clefts, not of an embryonic germ, but of some fragments of adjacent tissue, *i.e.*, a true "enclavoma," according to the recently suggested word which he considers should be adopted.

The description is accompanied by four excellent trichromic micro photographs. BERNARD CRIDLAND.

(4) **Greeves,** of London, bases the present paper on the records of forty-two cases of primary growth of the lacrymal gland reported during the last fifteen years, and to these he adds descriptions of four cases, the pathological preparations of which he has been in a position to examine. As an exercise in the classification of these rare tumours, the paper is likely to prove useful to other surgeons.

Greeves summarises his communication in the following way:

"Tumours of the lacrymal gland may be divided into two main classes:—(A) Mixed tumours. (B) Tumours the main histological feature of which is an overgrowth of small round cells in the gland stroma.

"Those belonging to (A) are never multiple. They occur in adult life, are of slow growth, do not recur locally if completely removed, nor do they give rise to metastasis in the lymphatic glands or elsewhere. A fatal issue has been reported in some cases owing to the direct spread of the growth to the meninges.

"Class (B) includes tumours arising in one gland only, as well as multiple enlargements of the lacrymal and salivary glands, the microscopical appearance in all these cases bearing a strong resemblance to one another.

"Of the unilateral single tumours, all have been described as sarcomata, but the clinical features in the majority of cases have not supported this diagnosis. That small round-celled sarcoma of the gland may, however occur, is shown by an undoubted case reported here.

"It is possible that inflammatory and secondary enlargements of the gland are included among the cases in this group.

"There is no evidence of the occurrence of true adenomata and adenocarcinomata of the lacrymal gland." SYDNEY STEPHENSON.

V.—TRAUMATIC AMBLYOPIA.

(1) Parsons, J. Herbert.—The psychology of traumatic amblyopia following the explosion of shells. *Lancet*, April 3rd, 1915.

(2) Pemberton, Hugh, S.—The psychology of traumatic amblyopia following the explosion of shells. *Lancet*, May 8th, 1915.

(3) Turner, William Aldren.—Remarks on cases of nervous and mental shock observed in the Base Hospitals in France. *Brit. Med. Journal*, May 15th, 1915.

(1) The symptoms of the condition which is known as "traumatic amblyopia "are becoming familiar to ophthalmologists through the writings of those who have to deal with the wounded.

The article by **Parsons,** of London, is concerned with the explanation of these symptoms, which latter will be found detailed in the article by C. S. Myers in the *Lancet* for February 13th, 1915 (for abstract see THE OPHTHALMOSCOPE for April, p. 202). "There are several suspicious symptoms," says Parsons, "in many such cases. The eye to recover last is often the shooting eye. Some patients show an obvious disinclination to return to duty. Some candidly admit to being in a 'blue funk.' In all there has been a complete mental upset, sometimes accompanied by hysterical symptoms—outbursts of weeping, etc.—in the early stages. These features render it only too easy to jump to the conclusion that there is often a large element of shamming in the case. It is because there is a very grave danger of cruel injustice being done to the men who have faced the music and come battered out of the ordeal that I wish to attempt an explanation of the underlying psychology."

The author proceeds then to an analysis of the evolution of character. This analysis, which is partly, at least, derived from the writings of C. Lloyd Morgan, J. Mark Baldwin, William MacDougall, and others, is practically impossible of abstraction. It leads up to a statement and a conclusion as regards these cases which may be quoted textually. The statement is as follows :—

"In the cases under consideration we are dealing with individuals of various moral and psychological character, disposition, and temperament. Their temperaments are determined chiefly by the conditions of their visceral organs and circulation. Their dispositions are determined by the sum total of the conative impulses of certain primitive instincts which vary within relatively narrow limits in their innate characteristics and relative strengths, and are subject to acquired modifications in accordance with the environment of the individual. Their characters are determined by their temperaments and modified innate dispositions, of which the latter are subject to a volitional control which varies according to the social environment and educative experience."

The conclusion arrived at, after discussing the effects of intense emotional shock on the complex human mind, is in these words "Though in the cases under special consideration there can be little doubt that the early loss of vision has a definite neural basis, it must, I think, be conceded that in the later stages the neural basis is of that undefined nature which we associate with so-called 'functional' conditions. In other words, it is neurotic, but it is not 'shamming,' difficult though the line be to draw between them,"

The last part of the article deals with the recovery of volitional control in the early stage of recovered consciousness. As recovery progresses, the outward manifestations of fear are more and more masked or suppressed, but the restoration of the self-regarding sentiment will be in accordance with the innate dispositions of the individual. "If he is naturally mean-spirited it is unlikely that his self-regarding sentiment has developed beyond the stage of merely masking an ever-present pusillanimity ; his motive power is limited to a sense of shame. If he is naturally of a fine character his fears will be suppressed with ever-increasing vigour as he becomes more and more conscious of the ideals of conduct which have shaped his character."

The final paragraphs indicate the care and tact which is necessary in investigating and treating such "wounds of consciousness" in the light of the past history of the individual and of his present mental attitude.

Hypnosis, according to Myers, may be valuable in reconstructing the history. Parsons is doubtful as to its use as a method of treatment.

"As regards therapeutic measures, it should be remembered that fright causes great exhaustion of the suprarenal glands."

The reviewer regrets his inability to do justice in an abstract to a remarkable article on an abstruse subject. ERNEST THOMSON.

(2) The case reported by **Pemberton, R.A.M.C.**, is another of the class, examples of which have already been published by various authors, in which various subjective phenomena, amblyopia being one of them, follow on a severe mental shock sustained on the field of battle.

In this case a sergeant, who had been at work for twelve hours continuously, was very severely shocked by the effect of a shell striking the next gun to his, decapitating one man and disembowelling a second. The symptoms presented were amblyopia with distinct contraction of the fields of vision, but no change in colour vision, blunting of the sense of taste, partial anæsthesia in the thigh region, a doubtful reduction in the sense of smell, and the customary reduction—from heavy gunfire—in the hearing. There was no nystagmus. He walked slowly with a distinctly spastic gait. When sent back to the wagon lines, the sensory changes gradually disappeared, while the symptoms of mental distress increased. He was finally transferred to England. ERNEST THOMSON.

(3) In the course of an interesting and suggestive article on the cases of shock observed in the base hospitals in France, **Turner**, of London, discusses the blindness and impairment of vision sometimes observed under those conditions. He distinguishes two types.—First, a number of soldiers suffering from symptoms of mild neurasthenia, complain of being "blind". They are affected with blepharospasm and photophobia, but, on examination, sight is found to be unimpaired. On closer enquiry, it is found that at the moment of the explosion, sand, dust, or mud was blown into the eyes, and had given rise to conjunctivitis, hypersensitiveness to light, and spasm of the eyelids. Recovery takes place quickly. Secondly, after recovery from the unconsciousness induced by the shock, the patients suffer from a temporary blindness or impairment of vision. In the early stages the eyeballs are tender to pressure. The pupillary light reflex is normal, and there are no ophthalmoscopic lesions. SYDNEY STEPHENSON.

VI.—THE INTRA-OCULAR PRESSURE.

Moore, R. Foster.—The intra-ocular tension, with especial reference to its variations in general and local vascular disease. *Royal London Ophthalmic Hospital Reports*, Vol. XX, Part i, May, 1915.

Moore, of London, contributes a very interesting paper on the vexed subject of the intra-ocular tension, with especial reference to its variations in general and local vascular disease. He uses a 2 per cent. cocaine solution before taking a Schiötz reading, and for practical clinical purposes, finds it acts excellently. He warms the footplate of the tonometer (he uses a Schiötz) before applying it. He has had trouble in three eyes from corneal abrasions, and discusses the cause thereof. The reviewer has on several occasions seen the same complication, which appears to him to be due to the use of the local anæsthetic, to the state of the corneal epithelium in late cases of glaucoma, and to trauma; and has found it can be avoided by instilling a small drop of sterilized liquid paraffin into the eye immediately before using the instrument. Moore prefers to work with the patient semi-recumbent, whereas many surgeons find the recumbent position the most restful, and therefore the best. This is a small matter. The directions given for the *technique* of the tonometry are practical and sound. The fixation of the patient's gaze by a mark on the ceiling, or by a dark object suspended above and looked at with the fellow eye, has been found by the reviewer to be most useful. A number of minor points are taken up and clearly dealt with in a way which should prove most useful to a beginner. The paper is so systematic, clear, and thorough that one makes one observation with some regret, *viz.*, that the writer states that he has "no reason to doubt that the readings obtained by the tonometer accurately represent the intra-ocular tension in mm. of mercury," and that the rest of his paper is based on this assumption. To put the matter in the pithy sentence of Priestley Smith, "when a tonometric observation is recorded, it is the reading and not the supposed equivalent in mm. Hg. which should be stated. The reading is a fact; the other is an inference, which may be correct or incorrect" (*Ophth. Rev.*, March, 1915). The paragraphs on the relationship between finger estimations of tension and tonometric readings are of interest, but the growing volume of opinion which this paper helps to swell, that tonometer readings are essential for record purposes, and that finger readings must be regarded only as rough and preliminary tests, is rapidly relegating the old T. + 1 etc., to the background.

The observations on the relation between the general blood pressure and the intra-ocular tension are of the greater interest, since they support and reinforce the conclusions arrived at by other recent workers in the same field. We may summarise the position in Moore's words, "It is clear then that such variations as occur in the tension of the globe are not caused by, or associated with, a like variation in general blood pressure." It will repay anyone who is interested in the subject to turn from Moore's facts and figures to those appearing under the names of Craggs and Taylor, in THE OPHTHALMOSCOPE of June, 1913. The Madras workers summarise their conclusion "that high arterial tension is not a necessary or even a leading factor in the ætiology of glaucoma."

Moore's experiments on the influence on intra-ocular tension of occlusion of the common carotid artery are both ingenious and instructive. The effects produced are as marked as they are transitory. He suggests that the method may be put to use clinically, as an aid during operations. The very short duration of the effect produced, and the fact that the tension returns to within a very small figure of that at which it originally stood make it doubtful whether the suggestion will prove of great value, especially as there are more permanent, and, we think, less risky, if less dramatic, methods of producing a lowering of the intra-ocular pressure. The suggestion is none the less both ingenious and legitimate.

It is well-known that the pulse wave can be observed on the tonometer lever when the instrument is applied to an eye; indeed, we believe that the presence of such a wave is a most delicate test that the instrument is applied truly. In this connection Moore has a very interesting observation to make. He finds that "the higher the blood pressure, *i.e.*, the more pronounced the arterio-sclerosis, the less forcibly is the pulse wave transmitted to the contents of the eyeball." On the other hand, "the pulse wave is certainly not eliminated even though the intra-ocular tension be very high, thus in a patient in whom the latter was 115 mm. the pulse was transmitted to the tonometer." This observation, which is in accordance with the reviewer's experience, leads the writer on to discuss the fact that a rise in general blood pressure, as a result of arterio-sclerosis, does not lead to a corresponding rise in intra-ocular pressure. He suggests, what Priestley Smith has already pointed out, that the conditions prevailing in arterio-sclerosis are not those which might be expected to produce a high grade of pressure in the retinal and ciliary arteries. Incidentally, the difference between the arterial pulse of glaucoma and that of aortic regurgitation is explained. In substance the explanation is of course perfectly correct, but the terms in which it is couched appear to the reviewer to be liable to lead a learner into difficulties. Thus Moore, speaking of the glaucoma pulse, says that during diastole "the artery is emptied." Whereas it is, of course, only the proximal segment of it that undergoes emptying; again, he says that in aortic regurgitation "an already full artery becomes farther distended at each systole," whereas the pulse in question is due to the fact that the arteries are unusually empty at the commencement of each act of systole. No one knows these facts better than Moore himself, but he has possibly overlooked the light in which his presentation of the case may be regarded. These remarks are made, not in any spirit of criticism, which would be unworthy in the discussion of such an excellent paper, but in the interests of those who have not thoroughly mastered the problems here under discussion, and who undoubtedly will read this paper with much advantage. For the same reason one could wish that the term "intra-ocular tension" did not appear, as it is misleading. We can talk of "intra-ocular pressure," or of "ocular tension," but not correctly of "intra-ocular tension."

The remarks on a condition clinically indistinguisable from embolism of the central artery are of such interest that we may express a hope that the further communication on the same subject, which is here foreshadowed, may soon be forthcoming.

The paper closes with a study of the influence of instillations of homatropine on the intra-ocular pressure, under certain pathological conditions.

It is a communication which should be read, and read carefully, by all who are interested in the subjects with which it deals, for it bears on every page the impress of thoughtful, painstaking, and careful work. R. H. ELLIOT.

VII.—TROPICAL EYE DISEASES.

(1) **Leber, A.—On tropical eye diseases. (Ueber tropische Augenkrankheiten.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1912.

(2) **Motais, Francois.—Notes on colonial ophthalmology. (Notes d'ophtalmologie coloniale.)** *L'Ophtalmologie Provinciale*, décembre, 1912.

(3) **Westhoff, C. H. A. — Eye diseases in Java. (Augenkrankheiten auf Java.)** *Centralbl. f. prak. Augenheilkunde*, February, 1913.

(4) **Foley, H.—Contagious ophthalmia in the Oran Sahara. (Les ophtalmies contagieuses dans le Sahara oranais).** *Ann. d'Oculistique*, avril, 1913.

(5) **MacCallan, A. F.—Ophthalmic progress in Egypt.** *Lancet*, August 16th, 1913.

(6) **Passera, Ercole.**—Frequency and nature of the eye diseases in Tripoli and the Tripolitans, with particular reference to trachoma. (Frequenza e natura delle malattie oftalmiche in Tripoli e nella Tripolitania, con particloare riguardo al tracoma.) *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(7) **Cosmettatos, G. F.**—The frequency and clinical forms of trachoma in Greece. (De la fréquence et des formes cliniques du trachome en Grèce.) *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(1) **Leber,** of Göttingen, draws attention to some differences in the affections of the eye as seen in tropical and temperate lands. The author states that many constitutional diseases are absent from the tropics, and so the ocular complications are not observed. He is unfortunate, by the way, in mentioning diabetes as one of these diseases, because it is exceedingly common in tropical India. The ordinary causes of suppuration, staphylococci, streptococci, and pneumococci are infrequent and relatively benign, but other organisms show increased potency. Speaking of the Malay-Polynesian group of islands, the author notes the great frequency of affections of the lids, especially those caused by measles and small-pox. Filarial disease is frequent, and irritation from vegetable juices (*euphorbiæ*) common. There is a much greater healing power than is seen in Europe. Frambœsia appears to avoid the uveal tract, although it affects the cornea and conjunctiva. T. HARRISON BUTLER.

(2) **Motais** gives an account of the kind of ophthalmic cases met with in Africa. Among the conditions are traumatic cataract, senile cataract, one case of glaucoma, very few pronounced cases of ametropia, some rare fundus diseases (choroido-retinitis), keratitis, uveitis, leprosy of the lids. He declares that syphilis is very widespread in these old Mussulman races. Although he treated many primary and secondary lesions, yet he never met with gummata, few ocular lesions, and still fewer "para-syphilitic" lesions. He attributes this immunity to an attenuation of the virus. Perhaps the small amount of brain and eye work may have something to do with it.

Cases of trachomatous and catarrhal conjunctivitis are exceedingly common. They are especially rife amongst the nomadic tribes, and Motais thinks they are due to the manner in which the people are huddled together at night.

The author gives some statistics of two epidemics of catarrhal conjunctivitis amongst the soldiers and their families. His conclusions are that—(1) a greater number of children were infected than adults; (2) the more the adults mixed with the children the more they were infected, and the women more so than the men. Married men were more affected than the unmarried.

P. A. HARRY.

(3) **Westhoff** was the chief of the Queen Wilhelmina Hospital at Bandoeng in Java. He died a month after the publication of the article under review, on the 24th of March, 1913, in Sydney, on his way back to Java. The natives from the whole country come to Bandoeng with eye affections. He finds that most of the natives are emmetropes with normal visual acuity, 6/6; V. = 6/4 is very rare. Myopia and astigmatism are rare. Presbyopia comes on earlier than in this country; most natives require aids for reading at 40, and this applies, to a great extent, to Europeans who have lived in the tropics for many years. Colour blindness is common; 2½ per cent. of the native officials are red-green blind. Epicanthus is frequent, but blepharitis and other scrofulous affections are very unusual. The great plague of the

population is trachoma, which occurs in the severest form and frequently leads to blindness. Gonorrhœal conjunctivitis is also very frequent. Dacryocystitis practically never occurs, and therefore ulcus serpens is seldom seen. Syphilitic iritis is frequent, as is also glaucoma in its various forms. Cataract is also very common. Retinitis pigmentosa is frequently seen. Some of the native medicines and methods are mentioned and these bear a resemblance to those in use among the more ignorant European populations.

A. LEVY.

(4) **Foley**, of the Institut Pasteur of Algeria, has investigated 530 cases of conjunctivitis occurring in the district of Beni-Ounif-de-Figuig in the Sahara. He finds that the disease is commonest in children, and that there are two periods of maximum incidence annually, one in May and June and the other in October and November, when the temperature is medium and flies are commonest, but there is no proof that the latter carry infection. Koch-Weeks and gonococcal conjunctivitis run an unusually mild course, as does trachoma, which is almost universally present. R. J. COULTER.

(5) A short account of what has been done in Egypt for the relief of sufferers from eye diseases, since the establishment of a fund by the liberality of Sir E. Cassel in 1903, is given by **MacCallan**, director of ophthalmic hospitals in Egypt. The first hospital was of the travelling type. Since 1906, in which year the first permanent hospital was built, the hospitals have been a definite branch of the Government service. The annual amount now available for ophthalmic purposes is £E19,000, and this sum is inadequate. It is proposed to provide a specially built hospital at Aswan, at a cost of £E3,000, as soon as that sum can be obtained. " Neither the Government nor local effort can provide such an amount, and it is an opportunity for someone in England to extend his generosity and his sympathy with the people of this poor province." It has been found that more than 16 per cent. of the patients examined in this province are blind of one or both eyes as the result of acute ophthalmia. Referring to Egypt as a whole, the writer says, " Money, skilled labour, and time will gradually work a vast improvement among a people who are intensely anxious to avail themselves of the small amount of ophthalmic relief which is at present obtainable." (The Egyptian £ is worth approximately 20*s.* 3¾*d.* English). ERNEST THOMSON.

(6) **Passera,** of Tripoli, gives a brief statistical account of the eye affections found among the inhabitants of Tripoli—Mussulmans, Hebrews, and others. Some 35 per cent. of the population are the victims of eye disease, trachoma alone accounting for 23 per cent. Trachoma is most common among the Mussulman population. Next in order of frequency comes acute catarrhal conjunctivitis, and this is least common among the Mussulmans. Injuries, cataracts, pterygium, chalazion, etc., occur in very much smaller numbers. A. J. BALLANTYNE.

(7) **Cosmettatos**, of Athens, states that trachoma is endemic in Greece, and he found it in 3,000 out of 14,000 cases of eye disease seen in the course of six years. In the great majority (2,946 in 3,000 cases) it is chronic. The varieties described are the chronic papillary form, including the simple hypertrophic and the papillary form properly so-called, the granular form, pure and mixed, and the cicatricial form. A. J. BALLANTYNE.

VIII.—BURNS OF THE EYE.

(1) **Derig.—Lip and epidermis grafts in diseases of the cornea and cauterizations of the eye. (Pfropfung von Lippen-Mundschleimhaut und Epidermislappen bei Erkrankungen der Hornhaut und Verätzungen des Auges.)** *Zeitschrift für Augenheilkunde*, June, 1914.

(2) **Cantonnet, D.—Traumatisms of the eye and their consequences from the medico-legal aspect.** *Universal Medical Record*, November, 1914.

(3) **Cantonnet, D.—Burns of the eye.** *Medical Press and Circular*, November 25th, 1914.

(4) **Cecchetto, E.—Cupola-like formations upon the surface of the eyeball following burns of the conjunctiva by metal in a state of fusion (solder, lead). [Delle formazioni a calotta, sulla superficie del globo oculare, per penetrazione nel seno congiuntivale di gocciole di taluni metalli in fusione (stagno, piombo).]** *Annali di Ottalmologia*, Vol. XLI, fasc. 1-2, p. 49 to 55.

(1) **Derig**, of New York, has used grafts of mucous membrane from the lip and mouth, and occasionally of skin from the ear, to cure pannus, keratitis, and burns of the conjunctiva caused by lime, ammonia, and similar caustics. In cases of pannus he performs a peritomy adjacent to the pannus, exposes and cleans the sclera and interposes a lip graft. Cauterized conjunctiva is cut away, and the defect closed with a lip graft. His results have been encouraging. He has used the method seventy-one times. In certain cases of pannus the graft has eventually been absorbed, and pannus has recurred. In such cases he has successfully used an epidermis graft.

T. HARRISON BUTLER.

(2 and 3) These communications by **Cantonnet**, of Paris, more especially the first one, cover much ground, and are evidently written more for the delectation of the general practitioner of medicine than for the instruction of the ophthalmic surgeon. They abound, however, with useful hints. Speaking of burns of the cornea, as by lime or vitriol, Cantonnet lays stress upon testing the sensibility of the parts, which he regards as of great importance as regards the prognosis. Discussing the medico-legal examination of patients suffering from traumatisms of the eye, he insists upon the necessity of proceeding methodically, and adds the wise advice to make use of terms that connote a certain amount of elasticity, such, for example, as "except for ulterior complications, always possible, it is probable that . . . ." He argues that compensation for injury should take into account, not only the loss of professional capacity, but also the production of personal deformity. He further suggests that the law should allow some small sum for the obtaining and upkeep of an artificial eye when such is necessary, and also for the loss of binocular vision where the sufferer has been operated on for traumatic cataract. When an individual has lost all his professional capacity from an accident, it appears that the French law grants him an indemnity equal to two-thirds of his salary. If one eye be lost, then, the amount will reach about the moiety of 28 per cent. to 35 per cent. of his wages.

SYDNEY STEPHENSON.

(4) According to the experiences of **Cecchetto**, of Parma, upon guinea-pigs and rabbits, and from two cases which he reports, analogous to those of Röhmer, of Nancy, splashes of molten lead or solder (*stagno*) which

accidentally gain access to the conjunctival sac, are often transformed, thanks to the humidity of the parts and the spheroidal state assumed by the metal, into a sort of mould over the cornea. The metallic lamella may be readily removed, and the lesions heal very quickly, inasmuch as they are superficial.

A. ANTONELLI.

IX.—THE HISTOLOGY OF A SUCCESSFUL SCLEROSTOMY.

Verhoeff, F. H.— Histological findings after successful sclerostomy. *Arch. of Ophth.*, Vol. XLIV, No. 2, March, 1915.

Verhoeff, of Boston, was able to remove an eye on which a sclerostomy (or sclerectomy) had been performed with a Verhoeff punch fifty-two days after the operation, a diagnosis of sarcoma having been made in the meantime.

The fistula was filled with an extremely delicate connective tissue, almost free from cells, "this tissue had evidently originated, not from the sclera, but from the tissue of the bleb. Within it were numerous irregular ill-defined empty spaces, which communicated with other spaces, which opened directly into the anterior chamber" ; the latter were therefore taken to be analogous to the iris crypts. Neither the free surface of the tissue nor the spaces of the crypts showed any endothelial lining. "The edges of the scleral fistula showed evidences of recent proliferation, with formation of new fibrous tissue, and increase in the number of fixed cells." This was attributed to the trauma of the operation. There had also been some proliferation from the outer surface of the sclera everywhere beneath the conjunctival bleb, which surmounted the fistula. The resulting new tissue had a much denser character than that of the bleb itself, and had, in places, extended as a thin layer over the outer end of the fistula, contracting the diameter of the opening. Descemet's membrane ended abruptly about .5 mm. from the edge of the opening, apparently having retracted from it. The conjunctival bleb was not really a bleb, for it consisted of an œdematous delicate connective tissue meshwork, closely similar to iris stroma ; ramifying within this tissue were irregular communicating spaces which were incompletely filled with connective tissue, so extremely delicate as to be scarcely visible. None of them was lined with endothelium or had definite walls ; they evidently resulted from the distension of the tissue spaces by intra-ocular pressure. The œdematous tissue extended down into the fistula for about two-thirds of its depth.

Verhoeff discusses the question whether or not, after a sclerectomy, the fluid escapes into the subconjunctival tissue spaces in the manner assumed by Elliot, Herbert, and others. He has always contended that the sharply circumscribed character of the bleb showed that this was not the case, and has advanced the somewhat fanciful idea that probably most of the fluid passed through the epithelium into the conjunctival sac. Elliot, on the other hand, has pointed out that the sharply-raised vesicular type of scar is a result of faulty *technique*, and has evolved a method whereby a wide diffusion of the filtering fluid, such as is shown in Verhoeff's specimen, can be assured. He has pointed out that after a successful trephining, the extravasated fluid can be shown to be very widely distributed, often reaching the horizontal antero-posterior plane of the eye, or even lower. Verhoeff is now plainly disposed to come round to this view of the case, which has long been accepted on clinical evidence.

Another interesting practical point emerges from this report.—Elliot, at a very early stage, modified his conjunctival incision, changing it from a V-shaped cut with its two terminal points resting on the limbus to a cut roughly concentric with the limbus, but with the ends of the incision kept far away from the cornea. His motive in so doing was to preserve a free channel on either side of the cornea, whereby the fluid escaping from the fistula, could find its way freely into the whole extent of the subconjunctival area. Experience had shown him that if by any chance the incised conjunctiva became tied down to the underlying sclera by inflammation, the old type of incision gave too limited an area of subconjunctival space for the carrying on of sufficient absorption of fluid, a difficulty that was avoided by the newer *technique*. Others confirmed this observation clinically, but it has been left to Verhoeff to do so anatomically, as he does in the present report.

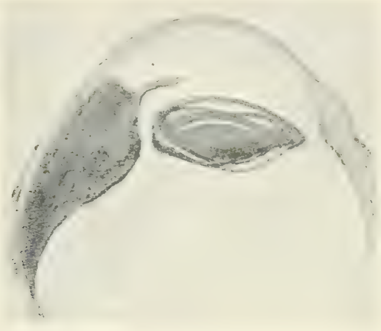


FIG. 1.—Showing the sarcoma of the ciliary body. Only the margin of the scleral fistula is included in the section, but the overlying "bleb" is well shown.

Nor are these the only tributes this pathological report renders to clinical experience. Holth has contended that the incarceration of iris tissue in the wound is a distinct advantage, as it, in his opinion, helps to keep the fistula patent by lining its walls. He has therefore advocated an intentional incarceration of iris tissue in the wound. Elliot, on the other hand, has strongly contended for the principle that the uveal tissue should be severely let alone, save in so far as the performance of an iridectomy helps to keep the fistula clear and patent by preventing prolapse into it of the iris or of the ciliary body. Verhoeff's finding that in the present case the fistula was free from iris pigment is therefore an important one, and puts the seal of practical experiment on the views expressed on clinical grounds by Elliot, and on pathological grounds by Collins, before the Clinical Congress of American Surgeons last year in London. To quote Verhoeff's own words, "certainly it is not essential to successful results for the fistula to be lined by pigment epithelium."

Another point of clinical interest comes out from the findings of this communication.—In the case under discussion, the fistula was made by the means of a Verhoeff's punch. According to Verhoeff's own admission, the edges of the fistula show evidences of proliferation as a result of the trauma of the operation. The consequence was that the lumen of the fistula had become distinctly narrowed. This observation constitutes an important confirmation of the view put forward by Elliot on clinical grounds, namely, that an obstruction of the fistula may be brought about, not only from the uveal and episcleral surfaces, but also by proliferation of the tissue of the sclera itself. Both Elliot and Temple Smith, who tried Verhoeff's punch, rejected it on the ground that it inflicted unnecessary trauma, an opinion which the present examination appears to confirm. Verhoeff states that he has never known "a bleb fail to persist that was translucent and free from inflammation seven weeks after the operation." We should be much more inclined to endorse this dictum if a term of seven months were substituted for one of seven weeks, and our criticism gains force from the note that the tension was reduced from 60 mm. to 30 mm., for the latter limit is too high to be wholly reassuring. Verhoeff's observations on the contrast between his method and that of Elliot are not convincing, inasmuch as his facts are open to question. He says "by Elliot's method the fistula is slanted toward the ciliary body," whereas by his method he claims that it is slanting away from the ciliary body. As a matter of fact, if a trephining is made according to Elliot's directions, the fistula slopes neither towards, nor from the ciliary body, but traverses the cornea at right angles to its two surfaces. Nor would it seem possible by means of the punch to cut out obliquely a piece of the cornea. It is difficult enough to make Verhoeff's punch work its way through the corneal sclera under the most favourable conditions, and if introduced obliquely, it is still more likely to jam. Verhoeff's contention that by his method "there are no tags of tissue remaining on the edges of the opening, whereas by Elliot's method the whole disc is cut out cleanly by the trephine, but the disc remains hinged and is cut away by means of scissors" carries no weight. The clean cut of a pair of sharp scissors does not inflict a fraction of the damage which is inevitable when using Verhoeff's punch. As to his contention that with this instrument there is less danger of injuring the lens than is the case with the trephine, we need only mention that in a thousand trephinings Elliot has not yet injured a lens.

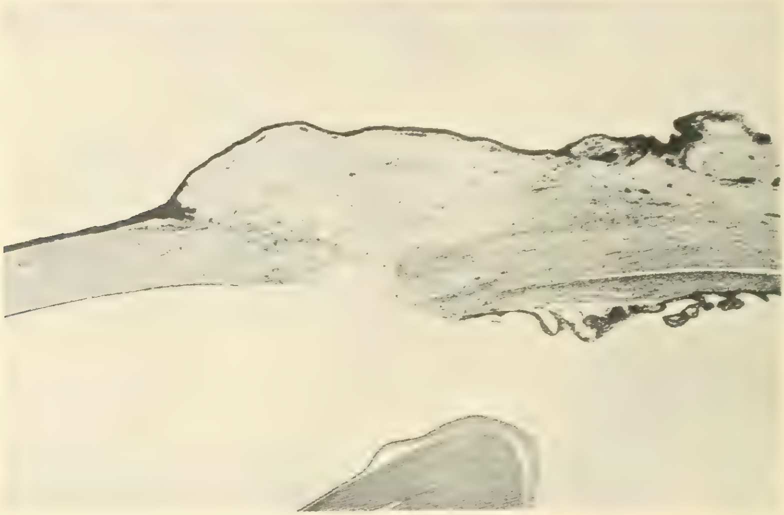


FIG. 2.—Section passing through about the middle of the fistula. Note the delicate tissue partly filling the latter. The larger black dots within the tissue are sarcoma cells.

The paper ends with some suggestive reflections on the influence which the rate of secretion of the intra-ocular fluid may have on glaucoma. The paper is one of considerable interest, and will certainly repay reading in the original. From the clinical point of view, we may find in it a good deal with which we cannot agree, but from the pathological standpoint, it is certainly of exceptional interest, and Verhoeff is to be congratulated on the communication.
S.

X.—THE PROGNOSIS OF GONORRHŒAL OPHTHALMIA.

Hirschberg, J. — The prognosis of gonorrhœal ophthalmia. (Die Prognose des gonorrhoischen Ophthalmie.) *Centralbl. f. prak. Augenheilkunde*, July, 1914.

Hirschberg, of Berlin, in compiling his "History of Ophthalmology," found only a single statistical table bearing upon the prognosis of gonorrhœal ophthalmia in all ophthalmic literature. This table was published by Lawrence in his text-book of 1830, and comprised 14 cases. The results were: double blindness in 50 per cent., blindness in one eye in 13 per cent., diminished vision in 21 per cent, and cured in 15 per cent.

Hirschberg thereupon asked Fehr to construct a table which would give the modern results. Fehr took the last seven years, 1907 to 1914, and tabulated all the cases coming to the R. Virchow Hospital during that time. There were, in all, 45 cases affecting 53 eyes, and the results were: complete cure in 71·7 per cent., cure with useful vision in 11·3 per cent., and cure with poor vision in 17 per cent. This result shows a complete reversal of the position as obtained by Lawrence in the early part of the nineteenth century.

Fehr's treatment consisted in ice applications as long as the cornea was clear, hourly *lavage* (day and night) with potassium permanganate lotion, vigorously painting the lids once daily with a 1 per cent. solution of silver nitrate, and afterwards inserting some atropine ointment and "Lenicet" ointment. In cases of severe chemosis the lids were scarified and any corneal ulceration was cauterised.

The healthy eye was protected by a celluloid capsule fixed on with adhesive plaster and kept on until the diseased eye secreted no longer and gonococci could not be found.
A. Levy.

XI.—OBSTRUCTION OF THE CENTRAL ARTERY OF THE RETINA.

(1) **Motolese, F.—An interesting case of obstruction of the central artery of the retina. (Un caso interessante de ostruzione dell'arteria centrale della retina.)** *Annali di Ottalmologia*, Vol. XLI, fasc. 3, pp. 144 to 151.

(2) **Coats, George.—Pathology of obstruction of the central artery of the retina.** *Royal London Ophthalmic Hospital Reports*, Vol. XIX, Part i, 1913.

(3) **Coats, G.—On the preservation of the visual field after obstruction of the central artery of the retina.** *Royal London Ophthalmic Hospital Reports*, Vol. XIX, Part i, 1913.

(4) **Coats, G.—Visible anastomoses on the papilla after obstruction of the central artery of the retina.** *Royal London Ophthalmic Hospital Reports*, Vol. XIX, Part i, 1913.

(5) **Reid, J.—Embolism of retinal artery.** *Brit. Med. Jour.*, 28th February, 1914.

(1) In a man of 63 years, affected with diffuse arterio-sclerosis, aortitis, and insufficiency of the semilunars, complete and definitive blindness was preceded for five months by myodesopsia and by several crises of passing amblyopia or amaurosis (these premonitory signs of obstruction should be compared, to the reviewer's mind, with Charcot's intermittent claudication.) It was only four days after the onset of blindness that **Motolese**, of Ancona, discovered the peripapillary retinal œdema and the "cherry red spot" at the macula, thus allowing a precise diagnosis to be made. During the first four days, as the ophthalmoscope showed only staphyloma and posterior sclero-choroiditis in a myopic eye, with reduction in the calibre of the vessels, and as pressure upon the globe in a backward direction caused pain, the diagnosis inclined rather towards "acute retro-ocular neuritis." This case, particularly by the length of the period of the premonitory signs, proves once again that so-called "embolism" of the central artery is nothing else than the final stage of obliterating arteritis. A. ANTONELLI.

(2) **Coats,** of London, reports the results of the examination of the eye in a third case of complete obstruction of the central artery of the retina, and discusses the pathology of the condition.

He gives the following summary of the case :—Clinical picture of obstruction of the central artery, six days after a sudden loss of vision in the right eye of a woman, aged 71 years. Six weeks later, glaucoma with signs of iritis. Excision almost two months from the onset of blindness. Left eye normal. Rheumatic fever when aged 18 years. Mitral stenosis. No albuminuria or glycosuria.

Pathologically.—Calcareous, structureless, unorganised mass in the central artery at the upper level of the lamina cribrosa. No adhesion to vessel wall, which is normal in this situation, except for partial loss of the endothelium. In front of the obstruction, the artery is thrombosed for a short distance, but a lumen is speedily restored by the accession of collaterals ; retinal arteries normal and well filled. Above the obstruction, artery small for a considerable distance, but free from disease of the wall or endarteritis ; finally, it reattains its normal dimensions and is filled with blood. Wall of central vein partially clothed with a thrombus which extends also into the inferior temporal branch. On the papilla this branch is very small and sclerosed ; in the retina it has normal walls, but is greatly distended, and its course is mapped out by a streak of hæmorrhage in the vitreous. Other retinal veins normal and full of blood. Higher up the nerve the partially thrombosed central vein recovers its full calibre by the entrance of small collaterals. Inner layers of retina atrophic ; outer normal. Glaucoma secondary to iritis. New-formed vascular membrane on anterior surface of iris, occluding the corneo-iridic angles, stretching across the pupil, and causing ectropium uveæ.

Coats considers that the obstructing mass originated in the heart, and was either a calcified thrombus formed in one of the cavities, or a portion of a calcareous valve, and the tissue in front of it organised thrombus. The filling of the vessels is due to the accession of collateral branches, and not to incomplete blocking with the passage of blood alongside; the collaterals concerned being offshoots of the circle of Zinn. The hæmorrhages are undoubtedly due to the venous thrombosis in the occluded branch after the re-establishment of the collateral anastomoses, the completeness of which is shown by the normal calibre, healthy walls, and well-filled state of the retinal vessels.

With regard to the glaucoma following arterial obstruction he states.—(1) There is good evidence that the sequence is more than a coincidence. (2) There is evidence that the glaucoma is not primary in type, but due to inflammation of the iris with the formation, usually, of a fibro-vascular membrane on its surface. (3) It is not impossible that in some cases the factor underlying these inflammatory changes and the glaucoma, is a thrombosis of retinal veins occurring while the circulation is in abeyance, and subsequently, when the circulation is restored, reproducing the conditions which obtain in primary thrombosis of the vens, conditions which are well known to lead not infrequently to glaucomai. There is no definite proof that the retinal opacity is due to œdema. It must therefore still be considered as due to ischæmic necrosis.

The author then summarises recent literature on the subject, and finally gives a list of communications. A. H. PAYAN DAWNAY.

(3) **Coats**, of London, reports six cases in which he has taken the fields to show that after obstruction of the central artery of the retina, a small part is preserved on the temporal side, corresponding to an area to the nasal side of the fovea in the region of the blind spot. This is opposed to the statement of Hancock, namely, that the retained field was in the extreme periphery, and in accordance with a case reported by de Schweinitz and Holloway. Coats' method of mapping was as follows.—Having roughly proved that the preserved field was temporal, the patient was placed at the perimeter and made to look at the fixation point through a long tube of paper held to his sound eye. By this means the amaurotic eye was kept steady, and in the absence of heterophoria or squint, its visual line was directed towards the fixation point. There were no cilio-retinal vessels in these cases. It is probable, therefore, that the preserved field depends for nutrition on capillary anastomoses between the retinal and ciliary systems in the region of the papilla.

A. H. PAYAN DAWNAY.

(4) In this case there was dense retinal opacity except at a small area on the temporal side of the disc corresponding to the distribution of a cilio-retinal artery. Subsequently, **Coats**, of London, noticed that the upper vessels remained smaller than the lower, and the retinal haze cleared more rapidly below. During this time small anastomotic channels were seen at the upper nasal quadrant of the disc, consisting of fine tortuous vessels starting from an inferior nasal branch by one channel, and spreading and dividing to connect with a superior nasal branch and a smaller vessel below it; between this superior nasal branch and one of its small branches there was similar anastomosis, and from the small branch another communication with a second and larger superior nasal vessel; a fine straight vessel connected the main superior nasal and temporal arteries. When seen nearly two years later, the anastomosis had diminished, leaving only one tortuous vessel between the upper and lower nasal arteries visible. There was no return of the sight.

A. H. PAYAN DAWNAY.

(5) A note upon a case of obstruction of a branch of the central retinal artery in one eye, associated with signs of dilatation of the heart, by **Reid**,

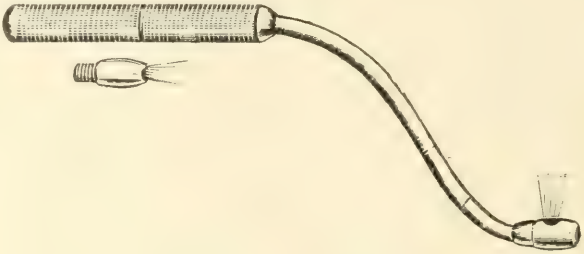
of London. This was followed in the course of a day or two by influenza, with dulness in the left chest and pain over the affected eye. "Thereafter the fundus improved, and so did vision."

No details of the case are vouchsafed. SYDNEY STEPHENSON.

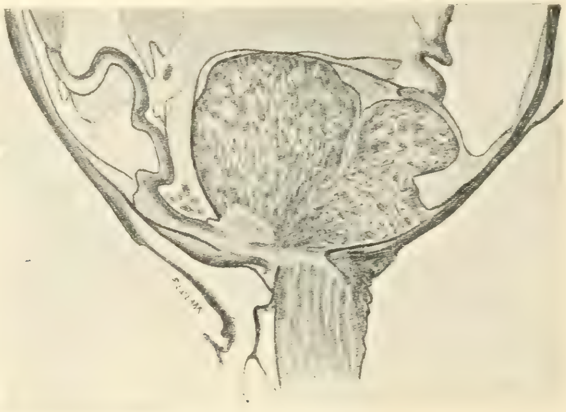
XII.—A NOVEL TRANSILLUMINATOR.

Greenwood, Allen.—Sarcoma of the choroid not demonstrable by the ordinary transilluminator. *Transactions American Ophthalmological Society*, 1913.

Greenwood, of Boston, reports this case as showing the utility of the modified transilluminator devised by Walter B. Lancaster. The instrument, of which a cut is given above, consists of a copper tube, about 3 mm. in diameter and 70 mm. in length, which contains the necessary insulated tubes. Current is supplied by a pocket flash-light battery. The softness of the tube allows of it being bent to suit the requirements of the case. A tungsten lamp is mounted at the end of the copper tube. Through an opening in the conjunctiva and Tenon's capsule, the lamp is passed directly to the point desired. By these means a sarcoma, situated behind the equator of the eyeball, may be demonstrated. This was so in Greenwood's patient, a lady,



Posterior ocular transilluminator.



Location and size of intraocular tumour.

aged 31 years, whose right eye was in a state of absolute glaucoma. A faint reflex only could be obtained with the ophthalmoscope, owing to the cloudiness of the media. The ordinary transilluminator showed a dull-red reflex everywhere, even when pushed as far back as possible. Eserin and pilocarpin failing to afford relief, iridectomy was performed. A week later ophthalmoscopic examination was possible, and revealed a detachment of the retina covering the optic disc, and extending downward and forward. Transillumination again showed nothing. The eye was removed. On testing the enucleated globe with the transilluminator (presumably Lancaster's) and pressing the point of the latter to the back of the eye, close up to the exit of the nerve, an entire loss of light transmission could be observed, which was restored if the appliance was moved more than 4mm. from any side of the nerve. The accompanying drawing shows the position and size of the intra-ocular growth, which, on pathological examination, proved to be a melanotic spindle-cell sarcoma. SYDNEY STEPHENSON.

XIII.—GENERAL ANÆSTHESIA IN EYE WORK.

(1) **Whiting, Maurice H.—Anæsthetics in eye-work.** *British Medical Journal*, November 21st, 1914.

(2) **Butler, T. Harrison.—General anæsthesia for eye operations,** *Brit. Med. Journal*, April 3rd, 1915.

(3) **Hird, R. Beatson.—General anæsthesia for eye operations,** *Ibidem*, April 17th, 1915.

(4) **Butler, T. Harrison. — General anæsthesia for eye operations.** *British Medical Journal*, May 8th, 1915.

(1) **Whiting**, of London, reiterates the statement made in his original communication to the *British Medical Journal* (see THE OPHTHALMOSCOPE, 1914, p. 662). Briefly, he still thinks, despite T. Harrison Butler, chloroform and ether to be preferable to ether alone in operations on the eye.

(2) After discussing the eye cases that usually call for the administration of a general anæsthetic, **Butler,** of Birmingham, has something to say as to the choice of an anæsthetic. He shows an uncompromising antagonism to the use of chloroform, either alone or combined with ether. Statistics are quoted in justification of his view. He employs ether. He prefers to induce unconsciousness with gas and ether mixed, and then to continue the anæsthesia with ether given by the so-called "open" method.

(3) In Butler's communication, abstracted above, he represents **Hird,** of Birmingham, as saying that he regards A. E. mixture as the best anæsthetic for eye work. This should be the chloroform and ether mixture (E C.)

SYDNEY STEPHENSON.

XIV.—OPERATIONS.

15.—Enucleation and Evisceration.

(1) **Green, John, jun.—Enucleation in hæmophilia.** *American Journal of Ophthalmology*, September, 1914.

(2) **Gifford, H.—On the technique of evisceration.** *Archives of Ophthalmology*, Vol. XLIV, No. 2, March, 1915.

(3) **Gradle, Harry S.—Concerning removal of the eyeball. ii.—Fat implantation.** *Archives of Ophthalmology*, Vol. XLIV, No. 2, March, 1915.

(1) In the case reported by **Green,** of St. Louis, the fact that the patient was a "bleeder" only emerged after the operation (enucleation). The persistent oozing after the operation, which was complicated by a large hernia of the orbital fat, was checked by normal serum, of which 10 c.c. was injected, followed by a similar quantity a few hours afterwards. Green suggests the prophylactic injection of normal serum in any enucleation case when there is a suspicion of hæmophilia. ERNEST THOMSON.

(2) **Gifford**, of Omaha, deprecates the unnecessary sacrifice of the cornea in evisceration operations, always provided that that membrane is not the seat of active infection. If the cornea be left, a larger ball can be inserted, provided that such a course as the insertion of a ball is deemed advisable. If the intention is not to introduce a ball, he advocates a cut right across the cornea and out into the scleral tissue on each side; the interior of the globe is well cleaned of uveal tissue, and the anterior half of the globe is pushed up against the posterior, with a large globular swab, coated with zinc ointment to prevent sticking. By these means a large flat stump is obtained, which provides an excellent support to an artificial eye. R. H. ELLIOT.

(3) **Gradle,** of Chicago, first discusses the various substances which have been implanted into the scleral capsule after evisceration. These include balls of silver, ivory, rubber, glass, wood, asbestos, glass-wool, aluminium, bone, pith, paraffin, etc. He says that these implantations have been given up by nearly all operators, because of (1) the tendency there is for the ball to be extruded in the course of time, and (2) the fear that the implant may set up irritation leading to sympathetic trouble. The writer next takes up the various implantations into Tenon's capsule. These have included glass, celluloid, silver, pith and other balls, complete rabbits' eyes, paraffin, skin and fat, and fat alone. The steps of a fat implantation operation are carefully detailed, an evisceration being dealt with first, and an enucleation afterwards. The statistics of 29 cases of enucleation, and of 54 cases of evisceration, all with fat implantation, are given. A fat implantation operation is contra-indicated in cases of acute infective trouble. If the fat cushion shrinks unduly, Gradle recommends the injection of sterilized white vaseline into the stump; before making this injection, one must make sure that a vessel has not been punctured. A warning is given of the danger incurred by injecting vaseline after enucleation, in cases in which a fat implantation has not been made, as the vaseline may "wander into the lids." The implantation of fat into the eviscerated scleral capsule is claimed to yield a stump far superior to that obtained by any other method. The article closes with the words, "It is

consequently advisable to endeavour to implant autogenous fat into Tenon's capsule, or into the scleral capsule, in every case of removal of the eyeball by enucleation or evisceration, except in the presence of acute infection of the coats of the eye."

R. H. ELLIOT.

16.—High Myopia.

Lambert, Walter E. — The operative treatment of high myopia. *New York State Journal of Medicine*, February, 1914.

Lambert, of New York, reviews the work of others, and challenges some of the most treasured beliefs of ophthalmologists as to the principles which should guide us in the operative treatment of myopia. He always operates on both eyes. In less than half of his cases (3 out of 7) were the conditions such as are generally considered to justify operation; in the remainder the patients were over the usually accepted age limit; in 3 of them there were extensive fundus changes, with profuse vitreous opacities, in both eyes of each; and in 3 the lenses were cataractous. In young subjects the writer advocates the Fukala operation, but in older ones he performs extraction after a preliminary iridectomy. Two of the cases have been under observation for seven years, without complications, and with excellent results. He believes his more recent cases will do equally well.

R. H. ELLIOT.

17.—Ptosis.

Claiborne, J. H.—Operation for ptosis. *Ophthalmology*, July, 1914.

Claiborne, of New York, describes and illustrates yet another operation for ptosis, which consists in excision of an elliptical piece of skin from the lid and of a narrow rectangular slip of the tarsus, and the closure of the skin wound by five stitches, each of which includes a "bite" of the tarso-orbital fascia in its passage between the lips of the skin wound.

A. J. BALLANTYNE.

18.—Keratoconus.

(1) **Wray, Charles.—The operative treatment of keratoconus (conical cornea).** *Proceedings Royal Society of Medicine: Section of Ophthalmology*, Vol. VII, July, 1914.

(2) **Tiffany, Flavel B.—New operation for conical cornea.** *Ophthalmic Record*, August, 1914.

(1) The remarks on conical cornea by **Wray,** of London, and the discussion which followed, seem to the reviewer to be so loose and discursive (perhaps "informal" would be a better term) that no good would result from an attempt to abstract them.

The text contains three figures illustrating the positions of the cauterisations made by Wray. S. E.

(2) The treatment adopted by **Tiffany,** of Kansas City, Mo., for conical cornea, consists in trephining at the limbus by Elliot's method, and then making a small peripheral iridotomy. If this does not suffice, he advises the removal of a small facet by the same procedure at the opposite point of the limbus, but a second iridotomy is omitted. In obstinate cases, repeated trephinings at the limbus, and in line with the recti muscles, are recommended. He claims that by this form of treatment the vision is permanently improved and tension is reduced. He cites a case in which vision had improved from 1/60 to 6/60 after some post-operative fluctuations of visual acuity and pain, necessitating the use of eserin and bandaging of the left eye, with rest in bed. J. JAMESON EVANS.

19.—Glaucoma.

(1) **Goodenow, Norman H.—Report on case of glaucoma cured by the "Elliot Operation."** *Ophthalmology*, January, 1915.

(2) **Holt, Erasmus E. — Sclerocorneal trephining.** *Ophthalmology*, January, 1915.

(1) **Goodenow**, of Everett, Washington, believes that glaucoma is caused by the development of toxins in the body due to long-continued general conditions. The underlying causes are the same as those which produce general arteriosclerosis and high blood-pressure. He groups these under two heads, namely: (1) Non-infectious, including faulty habits, errors of diet, excessive work, worry and anxiety, poisons like alcohol, tobacco, and lead; (2) Infections like syphilis, malaria, rheumatism, and chronic suppurative conditions.

The case of which he gives an account was one of long duration, which came under treatment on account of a severe attack of acute symptoms. The sclera was trephined, but the opening was too far back, and a recurrence took place. The trephining was repeated below, and a very good result was obtained. Vision, which before operation was 3/30, rose to 6/7·5, with correction. A. J. BALLANTYNE.

(2) **Holt,** of Portland, Maine, gives in this paper the results of his experience with the trephining operation since 1911. In all 29 operations were performed. The author favours the sliding flap modification advocated by Webster Fox, of Philadelphia, and states that he has used the von Hippel trephine with every satisfaction. The aim of the writer is to give a full account of all results, good and bad. To the latter belong cases of intraocular hæmorrhage, of which he seems to have had more than his share. In tabular form a statement is given of the type of the disease in each case, the state of the vision and tension before and after operation, etc. Then follows a detailed account of each individual case.

A. J. BALLANTYNE.

20.—Cataract.

(1) **Tydings, Oliver.—Should the intracapsular method of cataract extraction be adopted by the oculists of America?** *Ophthalmology*, January, 1915.

(2) **Fisher, W. A.—Twelve consecutive intracapsular cataract operations and their visual results.** *Ophthalmology*, January, 1915.

(3) **Vail, Derrick T.—Delayed healing of the wound in cataract extraction and its proper treatment.** *Ophthalmology*, January, 1915.

(4) **Green, A. S. and L. D.—The Smith Indian cataract operation in the light of scientific investigation.** *Ophthalmology*, January, 1915.

(1) **Tydings,** of Chicago, advocates the use of the Smith-Fisher *technique* in all cataract operations, especially in the case of those who contemplate the employment of Smith's intracapsular method. The latter should be practised on large numbers of pigs' eyes before it is attempted on the human subject.
A. J. BALLANTYNE.

(2) The ten patients on whom these twelve operations were performed were shown by **Fisher,** of Chicago, before the Chicago Ophthalmological Society in November, 1914. Half of them were cases of juvenile cataract. The writer pointed out that the pupils were not drawn up, and that astigmatism had been produced in only one eye out of the twelve. The average vision of the series was 20/24. He advises operators to cultivate the *technique* of lid control, etc., in their performance of ordinary extractions, before attempting the intracapsular method.
A. J. BALLANTYNE.

(3) After reviewing the causes enumerated in the text books to explain delayed healing of the cataract incision, **Vail,** of Cincinnati, mentions one to which he has seen no reference, namely, an intermittent spasm of the orbicularis palpebrarum muscle, which evacuates the aqueous and impedes closure of the wound. He has met with this condition more than once, and has treated it successfully by a vertical section of the tendon of the orbicularis at the outer canthus. A local anæsthetic is employed. He mentions cases in which the anterior chamber was still empty 12, 13, and 26 days after operation. In each case the wound was found closed and the anterior chamber reformed the day after performing the little operation referred to.*
A. J. BALLANTYNE.

(4) **A. S. and L. D. Green,** of San Francisco, point out the advantages of the Smith intracapsular operation as being (1) freedom from the occurrence of secondary cataract, (2) comparative freedom from post-operative inflammation, (3) its applicability to immature cataracts, and (4) the better average visual results. The only disadvantage which they admit to be inherent in the operation is the greater tendency to vitreous loss, and this, in their opinion, is not detrimental to the results. Its frequency and its seriousness are greatly reduced when the rules regarding the character of the incision and the control of the lids are properly carried out. The writers particularly emphasize the importance of making the incision large enough and of making it radial in direction, *i.e.*, emerging in the cornea midway between the limbus and the pupil. They are convinced that "the Smith intracapsular operation is the ideal surgical procedure for the removal of cataract."
A. J. BALLANTYNE.

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* See THE OPHTHALMOSCOPE, 1914, p. 470.

XV.—REMEDIES.

(*Sixth Notice.*)

(1) **Jacovides.—Autoserotherapy in ocular therapeutics. (De l'autosérotherapie en thérapeutique oculaire.)** *La Clinique Ophtalmologique,* 10 septembre, 1914.

(2) **Eason, H. L.—Case of bilateral temporary** (*sic !*) **hemianopia; rapid and permanent recovery of vision after the administration of thyroid extract.** *Proceedings Royal Society of Medicine: Section of Ophthalmology*, January, 1915.

(3) **Norman, Alfred C.—Tuberculin in ophthalmic practice.** *Hospital*, April 3rd, 1915.

(1) **Jacovides,** of Alexandria, has been much impressed with the value of autoserotherapy in the treatment of various ocular infections. He has so treated 25 hypopyon-ulcers of the cornea, 15 cases of infective keratitis of various kinds, 2 cases of acute iridocyclitis, 1 endogenous infection following a cataract operation, 2 corneal infections after traumatism with foreign bodies, and 1 abscess of the cornea following an infected chemical burn. The method followed is essentially that of Rohmer, of Nancy, in which a blister of considerable size is formed (by Rohmer on the arm, by Jacovides on the thigh), the fluid from the blister being then injected subconjunctivally. The amount of fluid so obtained varies from a maximum of 3 cc. to a minimum of [illegible].

Jacovides concludes that the serum, injected under the conjunctiva, acts something like a foreign body and causes a local inflammation of the conjunctiva, the lymphatic elements of which, combined with the polynuclears of the serum, bring about an intense phagocytosis, by means of which the micro-organisms of the ulcer or abscess of the cornea are destroyed.

ERNEST THOMSON.

(2) A patient, diagnosed as probably having a tumour of the pituitary body, was admitted under **Eason,** of London, as "practically blind." After a month's treatment with extract of thyroid gland, the patient recovered normal sight and nearly a full field of vision as regards his right eye. Nine years later, both optic discs white. R.V. 6/6. L.V. 6/60. Field of vision for the right eye normal; that of the left eye lost on the temporal side. It is interesting to note that unless the patient took small doses of thyroid from time to time, the sight began to fail and he suffered from headaches.*

SYDNEY STEPHENSON.

(3) During the last three years at the Durham County and Sunderland Eye Infirmary tuberculin has been employed on a large scale. **Norman** tells us that it is given as a matter of routine in all cases of phlyctenular conjunctivitis and keratitis, as well as in definite tuberculous infections of the eye, and in cases of blepharitis marginalis associated with the so-called "strumous diathesis." Struma itself is regarded by the author as "an abnormal vulnerability of the tissues" (Virchow) in subjects who have somewhere in their bodies a latent primary focus of tuberculosis.

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* Excellent results from the administration of thyroid in such cases have been reported by Axenfeld and de Schweinitz respectively.—*Editor.*

In giving tuberculin in eye cases, it is important to avoid producing an exacerbation of the symptoms. The system of dosage elaborated by the author has been designed with the object of producing a gradually increasing immunity without at any stage giving rise to a focal reaction. It has already been printed in these columns (April, 1915, p. 181).

SYDNEY STEPHENSON.

BOOK NOTICES.

Elements of Optics. By GEORGE W. PARKER, M.A., of Trinity College, Dublin. London, New York and Bombay: Longmans, Green & Co. 1915. Price, 2s 6d.

Elements of Optics, intended for the use of schools and colleges, is just the kind of unpretentious little book to put into the hands of students on first attending the practice of an ophthalmic hospital or department. It is meant for those whose knowledge of mathematics is limited to an acquaintance with elementary geometry, the solution of simple algebraic equations, and a few fundamental propositions in trigonometry. It is strictly of an elementary character. Its contents include "Reflection of light," "Refraction of light," "The eye and optical instruments," and, finally, "Dispersion of light."

SYDNEY STEPHENSON.

The Royal London Ophthalmic Hospital Reports. Volume XX, Part 1, May, 1915. London: Adlard & Son, Bartholomew Close, E.C. Price, 7s. 6d. net.

More than half of the present number of the *Reports* is occupied by an article from the scholarly pen of Mr. George Coats, dealing with that extraordinary combination of unblushing effrontery and real knowledge, the Chevalier Taylor, who pursued his erratic career from 1703 to 1767. The article is of great interest, and well worth reading. The rest of this number of the *Reports* is taken up by a couple of articles, one by the late E. Nettleship, dealing with "Pedigrees of colour-blindness," the material of which has been arranged by C. H. Usher; and the other by R. Foster Moore (Lang Research Scholar, 1913) on "The intra-ocular tension, with especial reference to its variations in general and local vascular disease" (for abstract see p. 346 of the present number of THE OPHTHALMOSCOPE).

The publishers announce that the subscription price of the *Reports* will in future be fifteen shillings for the volume of about four hundred pages.

SYDNEY STEPHENSON.

The Medical Annual, 1915. Bristol: John Wright and Sons, Ltd. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd. Price, 10s. net.

This handsome volume, now in its thirty-third year, is essentially a year-book of treatment and practitioners' index. It includes articles upon almost every conceivable subject likely to be of interest to practitioners of medicine. There are, as might be expected, special articles on naval and military surgery. The sections dealing with the eye are the work of

A. Hugh Thompson, of London, and of John H. Yearsley, of London and Bournemouth. The lion's share, however, has devolved upon the first-named writer. The work of each contributor is liberally illustrated with black and white and coloured pictures. The articles afford a comprehensive view of recent work in ophthalmology, and the work of both authors reaches a high standard of achievement. Although intended in the first instance for the general practitioner of medicine, the ophthalmic surgeon will find much to interest him in the *Medical Annual*, 1915. SYDNEY STEPHENSON.

Practical Medical Electricity: A handbook for house surgeons and practitioners. By ALFRED C. NORMAN, M.D. (Edin.) London: The Scientific Press, Limited, 28 and 29, Southampton Street, Strand, W.C. 1914. Price 5s. net.

This useful little book deals with medical electricity and with the X-rays. It is intended (to quote the preface) "to be a link between the works on medical electricity proper and those written for the technical student." Dr. Norman has managed to fill a gap, and has done it very well. As might be anticipated in a book written by an ophthalmic surgeon, a special chapter has been devoted to "Electricity in Ophthalmic Practice." In that chapter details will be found of the use of X-rays, the Morton-Marple ophthalmoscope, and electro-magnets. A convenient appliance (the invention of the author) of a head band furnished with an electric lamp and an adjustable trial frame, which is useful in practising retinoscopy, is also described and figured.

SYDNEY STEPHENSON.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

THE STUDY OF COLOUR-VISION.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—In your review of Mr. Parsons' book, "The Study of Colour-Vision," in the May issue of THE OPHTHALMOSCOPE, Mr. Harrison Butler is mistaken when stating, on page 266, that the conclusions obtained by Dr. Rivers in his investigations on the colour-vision of natives of Upper Egypt are fallacious; and is equally so in the grounds on which he bases that opinion. It is necessary, and only common fairness to the valuable and painstaking work done by Dr. Rivers, and from which Mr. Parsons so usefully quotes, to draw attention to this now, otherwise some serious doubt might perhaps subsequently arise as to its accuracy.

It is possible that amongst the pressure of other duties Mr. Harrison Butler may have failed to grasp the full meaning of Dr. Rivers' statement; and, although the differences between the two countries are not great, yet had he been as familiar with Egypt and its use of the colloquial form of Arabic, as he doubtless is with Palestine, he surely could not have fallen into the same error.

It is the confusion of colour nomenclature by the native peasant population or *fellahîn* on which Dr. Rivers specially dwells, and of this he conveys a perfectly accurate impression, which is fully in accordance with local conditions. Moreover, he shows good and extensive knowledge of the Arabic terminology of colours. Mr. Harrison Butler is unfortunate in saying, when correcting him, that *asmar* is the word for black; it means brown or tawny, and any doubt could have been removed by reference to the dictionary; Dr. Rivers fully recognises and uses properly the word for black, which is *iswid*.

In one other point Mr. Harrison Butler is at fault when stating that the wording *moya zurqa* (or "*moyezerka*") meaning "blue-water," is used to designate cataract. In Egypt this is entirely restricted to the description of glaucoma in any of its stages, with which the people are unfortunately only too familiar: the phrase used for any of the ordinary forms of cataract is *moya bêda* or "white-water." There is a sharp distinction between the two, and the one is never substituted for the other.

Dr. Rivers found much confusion and also limitation in the natives' use of colour-names; and failure to appreciate properly differences in colour-tones. This is quite characteristic of the Egyptian peasant class; the subject of colours is not one ordinarily demanding their attention, and therefore through not understanding the subject, the most elementary and sometimes haphazard description of colours is accurate enough to satisfy their requirements, and the names of the principal primary colours are sufficient for their general needs.

Accordingly, any very dark shade of colour would readily be described as black (*iswid*), or it might be called green (*akhdar*), or blue (*azraq*). The reason for this last-mentioned colour-name being used in this way is probably owing to their garments being commonly dyed with indigo; the resulting shades differ very widely, varying from darkest blue, which is practically black in many instances, to very palest blue in others. As it is easier for them to define such colours by their extreme shades, the last-named, by the same method would be described as white (*abyad*) and which is not unfrequent; or, perhaps, as milk-coloured (*lebani*). This latter word in the same general way is equally used to describe the lightest shades of almost any of the other colours.

In like manner the word for red (*ahmar*) is applied indiscriminately to anything beside red that has a warm tinge in it, such as purple, orange, or brown. A brown horse is invariably described as a "red horse" (*hûsan ahmar*). An expression used for brown is coffee-colour (*bûni*), and an alternative for it is "red like coffee" (*ahmar zay bûn*). The proper word for brown (*asmar*) is, except amongst the educated classes, seldom used, and then perhaps most frequently when describing anyone with a dark-brown face (*bil wishû asmar*), and it is to be noted that Dr. Rivers did not find this word *asmar* used at all by any of the peasants who were examined.

The paler shades of brown are commonly designated as yellow (*asfar*).

Although there are proper equivalents for grey in the language, yet their use is generally limited to those who are well educated. A fairly common word amongst the peasantry for grey is "ashen" (*rumâdy*); but it is not unusual to hear this or the lighter shades of any of the other colours, when not called white, simply referred to as an "open colour" (*lôn fatuh* or *maftûh*); or as a "colour a little dirty" (*lôn wisukh shûwayia*).

Anything pure white is commonly defined as "white like milk" (*abyad zay leban*); although milky (*lebani*), as already mentioned, is applied to things that are not white, such as pale grey or other light colours.

"Like cream" (*zay qishta*) or "like lime" (*zay gîr*) are also variations in emphasizing the purity of white as a colour.

Many other examples might be mentioned did space permit, and Dr. Rivers in his paper, printed in the *Journal of the Anthropological Institute*, Vol. XXXI, 1901, p. 229, also gives a very correct and interesting amplification of the diverse ways in which the intermediary shades of colour are expressed.

From the foregoing it will be seen how impossible it is to follow out successfully in Egypt a subject such as heredity, either in connection with variations of colour-perception, or in the occurrence of albinism.

Your obedient servant,

KENNETH SCOTT.

7, MANCHESTER SQUARE, W.,
June 11th, 1915.

THE THEORY OF VISION.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—I do not think that your columns are suitable for a polemical correspondence with Dr. Edridge-Green with regard to the functions of the rods. It seems to me that it is for him to bring forward some evidence to prove that the rods are not direct organs of sight rather than to expect others to prove that they are.

As an ardent supporter of many of Dr. Edridge-Green's views, it would be very painful for me to enter into a wordy war over minute details of his theory.

Yours truly,

T. HARRISON BUTLER.

LEAMINGTON SPA,
June 16th, 1915.

THE OPHTHALMOSCOPE DIARY.

1915.

American Ophthalmological Society	July 6th & 7th	New London, Conn.
Oxford Ophthalmological Congress	July 15th & 16th	Keble College Oxford.
Colorado Ophthalmological Congress.	July 22nd & 23rd	Denver.
American Academy of Ophthalmology and Oto-Laryngology	Oct. 5th to 7th	Chicago, Ill.

THE

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ORIGINAL COMMUNICATIONS.

THE TRAGEDY OF SCLEROSTOMY: AN ACCOUNT OF EIGHT EXAMPLES OF LATE INFECTION.*

BY

T. HARRISON BUTLER, M.D.Oxon.,

ASSISTANT SURGEON TO THE BIRMINGHAM AND MIDLAND EYE HOSPITAL;
HON. OPHTHALMIC SURGEON TO THE COVENTRY AND WARWICKSHIRE, AND TO THE
WARNEFORD, LEAMINGTON, AND SOUTH WARWICKSHIRE GENERAL HOSPITALS.

Introduction.

WHEN the newer operations for glaucoma were introduced, I took them up enthusiastically, and after trying the various methods recommended, I finally settled upon Holth's "punch operation" as the procedure best suited to my needs. Experience suggested certain modifications of *technique* and instruments, and at the end of the year 1913 I felt certain that sclerostomy was a valuable and safe procedure, and that its results in chronic glaucoma were superior to those attained by iridectomy.

Early in 1914 I suggested to Mr. J. Jameson Evans that we should analyse all our cases of glaucoma operations for the past five years, and present the figures to the forthcoming Oxford Congress. Neither of us had the slightest idea that the results following iridectomy would compare at all favourably with those yielded by the newer operations. As a matter of fact, you will recollect that we both independently discovered that our iridectomy results were at least as good as those of sclerectomy and sclerostomy. Mr. Evans had largely employed Herbert's "wedge isolation operation," I had performed more "punch operations"; we, however, both included several trephine cases. We came to the conclusion that the actual method chosen to effect a permanent drainage was of little moment: Lagrange's operation, trephining, "punching," or "wedge isolation," all yielded good results, in almost equal proportion. It seemed as though it was only necessary to decide what class of case was suitable for iridectomy and what class could be better served by sclerostomy. We both agreed that in acute glaucoma iridectomy was the safest method, and gave the best results.†

During the discussion which followed the reading of our paper, the question of late infection was obviously troubling many of the speakers. One after another confessed to this tragic complication, which had in one case led to panophthalmitis. An American surgeon had experienced sympathetic ophthalmitis, which fortunately yielded to large doses of salicylate of soda.

The effect of the discussion was to shake my faith in sclerostomy, and during the past year I have largely gone back to iridectomy.

I felt, however, more than half inclined to revert to sclerostomy, when I experienced a regular epidemic of cases of late infection, which now number eight. These calamitous events have finally convinced me that an eye with a fistulous scar is always in danger of more or less serious infection and that the operations liable to produce such a condition should be reserved for cases in which iridectomy has failed to lower tension, or in which the iris is so atrophic that iridectomy is obviously useless.

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* A paper read before the Oxford Ophthalmological Congress, July 15th, 1915.

† The original communication will be found in THE OPHTHALMOSCOPE, August, 1914.

You are well aware of the fact that the cystoid scar which sometimes follows cataract extraction and iridectomy has always been dreaded, because it was recognised that it occasionally led to the loss of the eye from infective processes which passed from the conjunctiva to the uveal tissues. And yet for the past decade we have all been trying to produce this condition which we had so justly dreaded.

During the past two years cases of late infection have been published with increasing frequency, and, doubtless, the majority have never reached the pages of ophthalmic literature. Probably, many surgeons have concluded that it was not the method which was to blame, but their own defective *technique*. Experience may discover some way of avoiding this complication, but to me it seems inherent in the operations. Our object is to produce a filtering scar; and such a scar seems to be a permanent source of danger.

I shall state my cases as shortly as possible and divide them into three groups: 1. Acute cases, ending in acute uveitis and panophthalmitis necessitating removal of the eye. 2. Cases of severe iridocyclitis, which destroy the sight; 3. Cases of mild iritis, and local inflammation round the aperture, which recover.

CASES.

1.—Acute cases.

1. H. D., male, aged 36 years. A case of heterochromic cyclitis, which developed the usual cataract. This was extracted, with a resulting acuity of 6/5 and J. 1. After a year, the glaucoma, which is typical of these cases, developed.

On January 24th, 1910, the eye was trephined below. The trephine hole healed up solidly, and there was no obvious filtration. The tension remained normal; but the excavation of the disc continued, and, eventually, sight was lost. There was never any evidence of acute inflammation, and the eye was never injected, although keratitis punctata was always present.

In February, 1915, five years after the trephining, the patient appeared with an injected painful eye. The anterior chamber was full of pus, and there was a large intercalary staphyloma. I had not seen the man for a year, but I gathered that the eye had been inflamed for some weeks. It was enucleated. It is possible that this case was not an example of late infection, but only an exacerbation of the cyclitis which had been going on for five years. I have, however, decided to include it, since it may have been an example of infection from without.

2. E. H., an alcoholic female, aged 55 years, a case of chronic glaucoma, with a tension of 82 mm. and 72 mm. of Hg. Deep cups. V.R.=6/60. V.L.=hand reflex.

February 16th, 1914.—Holth's punch operation with complete iridectomy. This operation reduced the tension to normal, and the acuity rose to 6/18. A satisfactory filtering scar developed, but there was no large bleb.

May 3rd, 1915, fifteen months after the operation.—The patient appeared with the eye in a state of acute panophthalmitis, and it had to be eviscerated. I had examined her a month ago, and made the note "all satisfactory."

She stated that fourteen days ago she had "ulcers" on the left lower lid, which got better. Then the right lower lid became "ulcerated," and three days later the eye became inflamed and painful. Here we have a clear history of a form of acute conjunctivitis followed by infection of the eye and panophthalmitis. The operation was in every respect a satisfactory one, and the result was excellent, and was maintained for over a year. We shall see later that the second eye became infected, but, happily, recovered (see case No. 7)

3. W. J., aged 64 years, male, chronic glaucoma, T + 1. V.L.=hand reflex. Deep cup.

February 20th, 1914.—A punch operation was performed upon the left eye, and a basal iridectomy was made. The flap was slightly button-holed, but the rent was sewn up, and healed firmly.

March 15th, 1914.—The tension has been reduced to normal. The aperture contains iris tissue; there is good filtration, but no bleb. No sign of any opening in the conjunctiva. V.=fingers at one foot.

April 19th, 1915, or a year and two months after the operation.—The patient appeared with a late infection. There was a yellowish swelling over the aperture, with intense injection of the eye and hypopyon. T.+1. V.= perception of light.

Under treatment, the iridocyclitis quieted down, the hypopyon became absorbed, and the swollen area over the site of the operation flattened down. The eye, however, became soft, and remained injected, and all vision disappeared. It was ultimately removed

The fellow eye, which had been successfully "punched," was not affected, and retains the same vision that it possessed a year ago.

In this case there was an error in *technique*, the flap was button-holed, but the resulting cicatrix was in every respect normal, and I not consider that the complication played any part in the infection. Fortunately, the eye was already a useless one.

2.—Sub-acute case.

4. E. L., aged 51 years, alcoholic female, sub-acute glaucoma of long duration.

April 16th, 1913.—"Punch operation" under ether anæsthesia. No iridectomy. The result was very satisfactory. The tension was reduced to normal, and the eye became quiet. No vision returned.

August 6th, 1913, or four months after the operation.—The patient was stung by a wasp, which caused much swelling of the lids and redness in the eye in question. She was seen on *September 17th*, and the eye was found to be acutely injected. There was a yellowish-white area over the punch hole, and an acute iritis. The inflammation quieted down, and the aperture cicatrized firmly. The tension rose slightly, but no further pain was experienced.

Here, again, the eye was a blind one, and no harm was done.

3.—Slight cases.

5. E. S. Aged 70 years, female. Affected with paralysis agitans. Chronic glaucoma. T.+1. in each eye.

February 4th, 1914 —Holth's "punch operation," with basal iridectomy was performed upon the right eye. A similar operation had been carried out in the case of the left eye on *January 21st*.

Large ectatic scars developed, but the result was good. Tension was reduced and sight improved.

November 13th, 1914, or eight months after the operation.—Patient appeared with a severe inflammation of the right eye. The bleb was now yellow in colour, and there was great œdema of the surrounding conjunctiva. There was a severe iridocyclitis with posterior synechiæ and great pain. Under treatment with atropine and the "muff-warmer," the eye made a complete recovery.

This is a typical example of a mild late infection, one, however, that might easily have turned out badly.

6. C. G. Aged 60 years. Chronic glaucoma.

The right eye had been removed by Dr. G. H. Pooley for intra-ocular tumour.

Glaucoma developed in the left, which gradually progressed in spite of treatment with miotics.

January 29th, 1915.—"Punch operation" with iridectomy.

On June 1st, 1915, or five months after the operation, I saw the patient. She was holding her own well, in spite of a slowly developing cataract. She had, however, a large ectatic bleb, which I showed to my house surgeon, and suggested that it was just the kind of fistulous scar which might become infected. My words were prophetic, for three days later, she came up again There was a local infection of the bleb, which was milky-white. The eye was painful and showed severe ciliary injection. A culture was made, and a greyish-green mould (*Mucor septatus*) grew luxuriantly. The use of protargol and atropine effected a rapid cure. No synechia developed; in fact, there was no evidence of actual iritis. This late infection did good, for the bleb has now flattened down, and the cicatrix is, I hope, now a safer one.

7. E. H.—The same patient, whose right eye had been removed for acute panophthalmitis (see case No. 2), the result of a late infection, came up on *June 21st* with acute iritis in her remaining eye. This eye had been "punched" on *February 9th*, 1914. The flap was not sutured, and at the first dressing it was found rolled back and was sutured into place. At the operation a drop of vitreous appeared in the wound, so no iridectomy was performed. The result was good. The tension, which measured 72 mm. of Hg., was permanently reduced to normal. The patient was at once admitted to hospital and treated with atropine and the "muff-warmer." The iritis has subsided, and the eye has been saved for the present. The scar produced by the operation was not ectatic, but filtered well. Present V.=6/18.

8. E. F., aged 52 years. Consulted me on *December 18th*, 1913.

I found that she had, unknown to herself, completely lost the sight of her right eye from chronic glaucoma. The eye had shown some tendency to become acutely inflamed, so I performed a "punch operation" with a small basal iridectomy. The aperture healed firmly, and there was soon no trace of it to be seen. The iridectomy, however, cured the tendency to acute glaucoma, and the eye has given no further trouble in any respect.

The left eye was treated with miotics, but the glaucoma slowly progressed, so on *July 21st*, 1914, I performed a "punch" operation with a basal iridectomy. A very small button-hole was detected in the flap, and, in consequence, the anterior chamber did not re-form for fourteen days. Eventually, however, a very satisfactory filtering scar developed showing a small bleb about the size of a pin's head. The glaucomatous process was arrested, the loss of vision, which had been progressive, ceased, and the tension was reduced from 50 mm. of Hg. to normal. On *January 23rd*, 1915, I saw the case, and found everything satisfactory. V.=6/12.

On *June 4th*, 1915, during my holiday, the eye became inflamed, and Miss F. consulted Mr. J. Jameson Evans, who found ciliary injection, discolouration of the iris, and posterior synechiæ. The bleb looked healthy, and there was no discharge. Atropine and protargol drops were ordered.

On *June 8th*, there was a thick mucopurulent discharge which contained no organisms visible in a smear.

June 9th.—Still profuse discharge. Pupil dilated.

June 15th.—Discharge much less.

June 17th.—I saw the patient. There was still some circumcorneal injection, and a few spots of fine keratitis punctata.

June 23rd.—The eye is now free from injection, the vision is 6/12, and there is no keratitis punctata.

In this case it is probable that the orifice was covered only by a thin layer of tissue, the flap was very thin, and as already stated, was slightly torn over the punch hole.

Conclusion.

An examination of the foregoing cases will show that every kind of scar was affected. In one case there was apparently firm cicatrization with no filtration ; others had ectatic scars. In two a small button-hole was made at the operation. Some operators make light of button-holes ; in fact some, I believe, turn back no flaps, and so leave an open hole in every case. My experience tends to show that a button-hole constitutes an additional danger.

I have always tried to obtain a thick flap of conjunctiva, and have generally succeeded in doing so. A thin covering to the aperture is obviously unsafe.

It may be suggested that my cases were mostly treated with the punch, and that my conclusions cannot be applied to the trephine operation. I can only state that the scars obtained by the punch method are in appearance, both to the naked-eye and under the microscope, almost exactly similar to those yielded by the trephine.

I conclude that late infection is a peril which, like the sword of Damocles, hangs over every eye which possesses a filtering cicatrix of any type, however obtained.

CHOROIDAL SCLEROSIS.*

BY

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PRIMARY sclerosis of the choroidal vessels is an uncommon condition, and the literature to which I have access contains very little information about it. Secondary choroidal sclerosis is not infrequently met with in advanced disseminated choroiditis, albuminuric retinitis, and other diseases of the retina and choroid. The sclerotic appearances of the choroidal vessels seen in posterior staphyloma are supposed by some authorities to be due to fissures in the pigment epithelium, consequent on its stretched conditions, because not infrequently the edges of the vessels are serrated. No proof of this hypothesis, as far as I know, has been adduced.

My remarks will be devoted to primary choroidal sclerosis entirely, with its accompanying complications. This disease is certainly rare, the text-books being either silent or containing merely a passing reference to the subject. It is characterized by atrophy of the hexagonal epithelium and chorio-capillaris, the red fundus becomes browner in tint, due to the exposure of the choroidal stroma with its pigment. The larger choroidal vessels being exposed by the loss of the pigment epithelium and capillaries, stand out

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clearly, which appearance is accentuated by white lateral streaks on the vessels. There are no signs of inflammation : the condition appears to be a slow degeneration of the vascular tissues. Roughly, three varieties may be recognized, named according to the areas in which they occur : the "macular," which chiefly, but not entirely, occurs in old people ; the "peri-papillary," which is most frequently met with ; and a "general sclerosis" of the entire visible choroidal vessels. The ophthalmoscopic appearances are limited to the areas named, and, in addition to those previously mentioned, there are frequently small hæmorrhages which appear to be very thin, so that the vessels can be dimly seen through them. The disc is pale, as a rule, and may show signs of atrophy ; the retinal vessels are in most cases unaffected. The white lateral streaks on the choroidal plexus, in advanced cases, extend across and coalesce, so that the vessels become bands of a creamy-white colour. A. S. Morton has figured in the *Transactions* of the Ophthalmological Society, Vol. V, a very marked case of sclerosis of the whole visible choroid, the vessels of which had become a mere white network, all the red tint having been lost.

Ætiology is obscure. The macular variety occurs chiefly in old people, and may be looked on as a senile degenerative process.

The peripapillary form has been said to be due to syphilis, but in all the cases I have seen, that disorder could more or less certainly be excluded. In the patient, whose notes I shall refer to immediateley, syphilis was certainly not the cause, the disease appearing during the menopause. The majority of these cases which I have seen have been in women, and the disease began in middle life ; there were no symptoms of arterio-sclerosis in the vessels of the body generally, and the blood pressure has not been raised. In the third variety, where there is general choroidal sclerosis, Adam says it is either due to syphilis, arterio-sclerosis, or nephritis. In the case reported by Morton, the man was a painter and suffered from gout, so possibly lead may have been a cause.

Leber has shown that the posterior choroidal vessels anastomose very slightly with each other ; Coats in his paper on posterior scleritis confirms these observations ; but even if there is no anastomosis, the current must be very sluggish in these vessels, so that it is probable whatever toxic agent causes the disease, plenty of opportunity is given for its action. That toxic substances circulating in the blood have a selective activity is well known, and in the eye is shown by the way albuminuria chiefly affects the retinal arteries and syphilis the choroid.

Hepburn showed some years ago that the posterior ciliary arteries nourish three separate areas, which are supplied by three groups of vessels, the macula, the mid-periphery, and the extreme periphery ; this observation is of interest because it corresponds to the first two areas wherein primary choroidal sclerosis is found.

The pathological anatomy is that of endarteritis, the vessels in extreme cases becoming mere fibrous cords.

The prognosis as regards vision is grave, especially in general sclerosis of the choroid. In the macular variety, although central vision is lost, total blindness does not result. In the perimacular cases also, total blindness does not take place. An important practical point in this connection is that choroidal sclerosis is not associated with cerebral sclerosis. On the contrary, when this disease attacks the retinal vessels, as well known, the cerebral vessels are usually concurrently affected. Hæmorrhages certainly increase the gravity of the prognosis as regards vision.

The following are the notes of an instance of this disease, which I have had under observation for two years :

Mrs. L. J., aged 46 years, complained that when she looked at objects with straight sides they appeared "zigzag." She had had attacks of these symptoms for the last twelve months, sometimes they only lasted for fifteen minutes, sometimes for a few days, but now has been complaining of them for six weeks. She also complains of diplopia. Her medical attendant had known her and her family for many years, and there was no evidence of syphilis whatever. She is married, and has four healthy children. No history of previous illness. The blood pressure was 110 mm. and there was no sugar or albumen in the urine. For about twelve months, menstruation had been very irregular, with frequent attacks of profuse menorrhagia. The diplopia was monocular and difficult to bring out. R.V. 6/24; L.V. 6/9 1 D. cyl., axis vertical. The left fundus was normal; in the right fundus on the outer side of the disc at its lower level was a zigzag hæmorrhage. At this period there was no evidence of choroidal sclerosis. I saw her again two months later, when the hæmorrhage had absorbed. The vision was unaltered; during this period she had been taking iodides. In October the vision had sunk to fingers at 2 feet, with eccentric fixation, and sclerosed choroidal vessels near the discs could be seen. Where the hæmorrhage had been there was a white line like a scar, and some crystalline bodies near. Seven months later, the vision of both eyes was unaltered, but there were two small irregular hæmorrhages near the left disc, and some sclerosed choroidal vessels seen. Six months later, the *left* vision suddenly dropped to $6/18_{ii}$, with more sclerotic vessels to be seen, and a small irregular hæmorrhage. During this period she had taken a large quantity of mercury and iodide.

A course of diaphoresis was now tried, but with no effect, so a subconjunctival injection of cyanide of mercury was given. She thought she was better after this, and up to March, 1915, the vision of the right, that is the first affected eye, improved to $6/12_{iii}$, but the left was unaltered. A month later, another hæmorrhage took place in the right eye, which resulted in the vision falling to fingers at 6 feet; and in May, two weeks ago, the R.V. was 2/60. Directly the fall in vision took place I began the injections again, but so far without any avail.*

With regard to treatment, my experience is that everything which I have tried has been useless except the subconjunctival injections of cyanide of mercury; but with these, in spite of temporary improvement, the vision has relapsed

The chief interest about this case is association with the menopause and irregular menorrhagia, and I have an impression that these cases are not infrequently associated with this period of life.

**Note July 11th*, 1915.—I have seen this patient again during the past week and the vision of *both* eyes has improved up to R.V. 6/60 L.V. 4/60, the latter from fingers at 3 feet. She attributes this herself to the fact that she had menstruated the previous week, the first time for six months. She has not had any treatment for two months.

A CLINICAL STUDY OF FIFTY-FIVE CASES OF INTRA-OCULAR RETENTION OF FOREIGN BODIES, WITH RESULTS TWO YEARS AFTERWARDS.

(*Continued.*)

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Treatment.

Having now studied the naked-eye appearance of the case and verified the diagnosis by means of the X-ray plate, we proceed to treatment.

Obviously, the chief point is to get rid of the foreign body as soon as possible. A piece of metal when retained in the eye, especially in the vitreous, over 24 hours, generally sets up an iridocyclitis, either of the slow plastic type, or of the more acute and purulent variety, which is liable to end in the slow destruction of the eyeball with resultant phthisis bulbi or in panophthalmitis.

Many cases have been recorded where the foreign body has been lodged in the eye, especially in the lens, for many years, without giving rise to inflammation, but these cases are always to be considered dangerous, as some day, without apparent explanation, the eye may suddenly develop an attack of acute inflammation. Ramsay[6] cites two cases to illustrate this point.—In one, the piece of metal, apparently, was in the ciliary region for twenty years without giving rise to any symptoms, and then suddenly an attack of acute inflammation commenced in the eye. In the other, the metal was lodged in the lens for eleven months without any discomfort, and, again, the eye suddenly developed acute iridocyclitis at the end of that time.

Before undertaking treatment by the magnet in a recent case, where we intend to deliver the metal into the anterior chamber, sterilized atropine ought to be instilled frequently into the eye, so as to dilate the pupil as widely as possible. Less pain is caused if the pupil is well dilated, as the metal "jumps" against the iris, after perforating the zonule as it is being brought forward; and, in these cases with dilated pupils, the foreign body is less liable to become entangled in the iris; and also there is less likelihood of an iridectomy being necessary.

We next come to the question whether the operation should be done under local or general anæsthesia. One great advantage of operating under cocaine is that the patient assists considerably in the extraction of the metal by the movements of his eyes, which he is told to make, and, given a fairly sensible subject with a well-dilated pupil (I am speaking of the case where it is decided to draw the metal into the anterior chamber), I think it is better to do the operation under local anæsthesia.

Another advantage of cocaine is from the diagnostic point of view where pain may be felt as the metal is attracted by the point of the magnet. As a rule, there is distinct pain in the eye, but in one case (No. 20) the small scale of metal appeared in the anterior chamber after travelling round the edge of the lens without any pain being experienced, and, unless the metal had been shown in the X-ray plate, it could quite easily have been missed owing to its small size (2 mm. by 1 mm.).

Under general anæsthesia, of course, an anæsthetist is needed, and usually an assistant to pull down and to direct the movements of the eyeball according to the difficulties which may arise.

Speaking generally, I should restrict the use of chloroform to the following class of cases: (i) Where the patient is very nervous, and where any sudden movement on his part, when the point of the magnet is in the anterior chamber or vitreous, might result in traumatic cataract or loss of vitreous. (ii) Where the foreign body is suspected to be non-magnetic from the history, *e.g.*, gunshot wounds, and where it may be necessary to enucleate the eye if the foreign body cannot be removed. (iii) Where, as I mentioned before, the X-ray plate shows the presence of a large piece of metal and the condition of the eyeball suggests the possibility of enucleation. (See cases 4, 5, and 14). In this class of case, I think it is better to obtain permission for enucleation, if necessary, and conduct the magnet operation under chloroform rather than to subject the patient to considerable pain during the removal of the metal.

This brings us to the different kinds of magnets, of which I have had experience of three:

(i) The vertical, or suspended magnet.

(ii) Haab's stationary horizontal giant magnet.

(iii) The Hirschberg hand magnet.

Another variety is (iv) the ring magnet. The advantage claimed for this appliance is that the lines of force are parallel and do not radiate, as in the other magnets. This is really a disadvantage, as T. Harrison Butler[7a] has pointed out, since it will not attract a piece of iron which lies in the lower part of the globe, because the field of the magnet is confined to a small plane at right angles to the plane of the ring. To get this attractive force, the eye must be placed so that the line joining the anterior chamber to the foreign body is horizontal, a rather difficult position. Besides, the ring magnet entails the patient sitting up, and this position has many disadvantages, as will be described presently.

It is well to have both a giant and a small magnet, since each has its different uses, as we shall presently see. Some authorities condemn the giant magnet, because, they say, it may cause considerable damage to the eye. If used in a proper manner, and in the proper class of case, I think it is a very serviceable instrument.

Of the two giant magnets mentioned above, I prefer the suspended one. Of the methods of suspension, I like the kind described by Ramsay,[7] where the magnet is suspended by a strong wire from the ceiling. At the other end of the wire is a suitable weight so adjusted as to render the manipulation of the magnet easy. After a little practice, it can be manipulated with great dexterity and precision.

Another method of suspension is to have a many-jointed bracket jutting out from behind the surgeon. I do not think this method of fixation is as good as the one mentioned above, as the magnet point cannot be manipulated so rapidly and easily to meet the difficulties which may arise, as is the case with the wire method of suspension.

The fears expressed by the admirers of the Haab magnet that the wire of the suspended magnet will break have not been realised in my experience. The one at the Glasgow Eye Infirmary has stood for years, and undergoes periodical testing without showing any defect. One outstanding advantage which this magnet has over the Haab magnet is that the patient is lying on the operating table, so that any further procedure, such as iridectomy, douching of the eye, limbal section, etc., when the metal is being drawn into the anterior chamber, can be carried on without moving the patient. When using the Haab magnet, on the other hand, the patient is seated on a chair, and requires to be transferred to the table under those circumstances. Again, in the suspended magnet, it is the magnet which is moved, assisted by telling the patient to look in a certain direction to direct the path of the metal forward. With the Haab, the operator manipulates the patient's head. The movements of the suspended magnet for the same purpose can be more carefully controlled, although at first this magnet seems a clumsy instrument. Again, the patient has pain in the eye as the metal passes forwards, and when the Haab magnet is being used, he naturally draws back the head, and so may complicate matters. In the sitting posture, too, the patient may faint. I would here cite E. Rollet,[8] who says that it is best to have the patient lying down, and the magnet fixed vertically.

Again, operating with the Haab magnet, the surgeon manipulates the current by a foot-rest. With the suspended magnet, on the other hand, this is left to a competent nurse, who manages the rheostat, and, at the words "One," "Two," and "Three" from the surgeon, switches on a weak, medium, or strong current, or "Off," as the case requires. The surgeon is thus in a position to give full attention to the eye, and at the words mentioned has the desired effect produced without having to move his foot and hold the patient's head at the same time, not to mention his observation of the patient's eye.

At least five points should be provided for the giant magnet: (1) a large round point, shaped like the closed end of a large thimble. This is usually applied first, and over the cornea, as it has the greatest attractive power of the five, and is useful in drawing small pieces of metal from the vitreous through the zonule into the anterior chamber. After this has been done, it should be laid aside, and one of the others, or the hand magnet, used, to suit the individual requirements of the case. (2) and (3) long, narrow, blunt, and long, narrow, sharp points. These are not round in the long axis, but flattened, so as to enable them to be inserted more readily and easily into a scleral wound without causing loss of vitreous. These points are useful for inserting into the vitreous after a scleral puncture, especially where the foreign body has been accurately localized; being narrow, they cause little damage. In one case (No. 2), a scleral puncture was done twice to try to extract a spicule which was embedded in the back of the eye, and projected forward through the retina into the vitreous. No detachment of the retina resulted, and the eye retained a visual acuity of 6/36, the diminution of vision being due to a localized cataract which was caused by the original injury. (4) and (5) angled blunt, and angled sharp points. These are useful in extracting pieces of metal from the anterior chamber with a weak current, although their use may be supplanted by the hand magnet. They are also useful for insertion into the ciliary region. (See case No. 28).

Non-magnetic instruments, of course, must be used throughout the operation, which is preceded by a sublimate douche, 1/2000. Careful sterilization and the avoidance of contamination of the magnet points are important, and rigid asepsis throughout. Generally, the *technique* usual before an eye operation is adopted.

With these prefatory remarks I will now pass forward to relate the different procedures which I have adopted in the different classes of cases, to consider the difficulties which may arise, and to discuss how to deal with these.

1. **Where the metal was in the anterior chamber, embedded in the iris, or behind the iris, and where the wound was corneal, or corneo-scleral.**

The method adopted in this class of case was to try, if possible, to extract the metal through the original wound, by introducing the point of the hand magnet into the anterior chamber. I think it quite legitimate practice to enlarge the corneal wound slightly in a direction away from the centre of the cornea, if it appears that by so doing, the metal can be extracted in a case where it was found impossible to draw the metal through the original wound: otherwise, unless the anterior chamber was empty, a limbal section with a Graefe knife was made at a point near the position of the metal, and the point of the hand magnet was introduced and the metal extracted by that route.

If the anterior chamber is empty, I think no harm can result by waiting some hours to allow it to re-form, when a section can be made without risk of damage to the lens and with less likelihood of hæmorrhage from the iris. If one sees the foreign body embedded in the iris, or even lying loose in the anterior chamber, I do not think it is good practice to try to seize it with forceps, as the first attempt is often a failure, and troublesome hæmorrhage, postponing the operation, with injury to the lens capsule may result. Magnetic force is much more satisfactory, that is, if the foreign body is magnetic, as less damage is likely to result, less pain is caused, and the method is more certain than trying to catch the particle with forceps. In some cases the metal was removed without interfering with the iris, but in others, prolapsed iris had to be excised. If the corneal wound is at all large, it should be covered by conjunctiva. The best way to do this is to incise and under-cut the conjunctiva all round the limbus, and by means of a catgut purse-string suture, draw it completely over the cornea. After a few days, the catgut is absorbed and the flap slips back into position, leaving a healed corneal wound. This method helps to heal the corneal wound more rapidly, and is an excellent precaution against sepsis. I have had no experience of the corneal suture as recommended by E. Maddox.[8a]

2. **Where the wound was corneal or corneo-scleral, and the metal embedded in the lens.**

Here the giant magnet with No. 1 point was applied over the centre of the cornea, to try to draw the metal into the anterior chamber. If this was successful, then a sharp point of the small magnet, or of the giant magnet, with reduced current, was introduced through the original wound, if large enough, or otherwise through a limbal incision, and the foreign body was extracted from the chamber. The cataract was dealt with later.

If the metal did not move from the lens after repeated attempts by the giant magnet, or even after actual application of a sharp point to the lens, then, unless there were symptoms necessitating the immediate removal of the lens, the case was left alone for a few days, when the magnet was again applied in the hope that the lens matter having become more swelled, the foreign body would be less firmly embedded. If this was again unsuccessful, then the case was left until the lens matter required to be drawn off. Sometimes when the incision was made for the drawing off of the lens matter, the foreign body escaped along with the gush of lens matter. If it did not do so, then the sharp point of the magnet was introduced through the incision, and the foreign body extracted. (See case No. 1).

I do not intend to criticise the different methods for the removal of soft lens matter in these cases. When the metal was removed at the first attempt and when it came to the extraction of the lens matter later, a small lateral corneal puncture with a Graefe knife was made, and the lens *débris* removed by Teale's suction tube; otherwise a keratome incision was employed.

3. **Where the metal was in the vitreous chamber.**

(*a*) Where there was a *recent* wound in the *sclera* or in the *ciliary* region. In every case an attempt should be made to draw the metal into the anterior chamber, and to extract by that route after a limbal section. There are several reasons for adopting this route:—first: where the wound is in the ciliary region. If the metal is extracted by the original wound route, further damage to the ciliary region is caused, and considerable haemorrhage may result. In some cases the metal "locked" in the wound, and necessitated enlargement of the latter. Second: where the wound is in the sclera: Extraction by this route sometimes entails more loss of vitreous, a serious thing in itself, besides, any tag of vitreous hanging out of the wound is an excellent culture medium for micro-organisms. Again, like the wound in the ciliary region, the metal often "locked" in the wound, and necessitated its enlargement. Further damage to the scleral wound renders subsequent detachment of the retina more liable to happen.

Although, as mentioned before, an attempt should always be made to draw the metal into the anterior chamber by the giant magnet, yet in many cases it is exceedingly difficult—in fact, impossible. This is particularly the case where a large scale is present, or a scale with ragged edges. In many of the cases, instead of sliding round the edge of the lens and perforating the zonule "edge first," they engage "broadside on," if I may use the expression, and become "locked" and firmly fixed in the circumlental space, an even more serious position than the first.

If it is found that the anterior chamber route cannot be adopted, then, of course, the metal must be extracted through the original wound. Before drawing a piece of metal by this route, it is well to dissect up the conjunctiva all round the wound, so as to cover the wound completely after the metal has been extracted.

As mentioned above, the metal sometimes "locks" in the wound by engaging "broadside on." In a case of this sort, one of the long narrow magnet points was inserted just inside the wound, and no more, and the metal engaged on it by turning on a weak current. Then, a flat, non-magnetic spatula was passed along the magnet point to push the scale on to the point of the magnet, so as to make it lie with the edge in the axis of the wound, when extraction was easy. I have found this manœuvre useful. It often prevents the necessity for an enlargement of the wound, with the chance of more vitreous being lost.

I have not tried the method recommended by Lamb,[9] of Cincinnati, who disapproves of Haab's method of removing foreign bodies from the eye by a large stationary magnet, because the practice of bringing the patient to the magnet is unnatural and awkward, and to the drawing of the metal into the anterior chamber, as causing injury to the ciliary body and lens. If the scleral wound is small, or the wound is corneal, he makes a meridional scleral incision about 6 mm. long, commencing 10 mm. behind the limbus, under a conjunctival flap. The small magnet was then used.

The *rationale* of this procedure is that the part of the sclera in question is suitable for operative interference because it is behind the ciliary body and in front of the ora serrata: it is not concerned with vision: it does not contain any important vessel or nerve; and, finally, it heals well. I think these reasons are excellent in theory, but I do not see the necessity of inflicting further damage to the eyeball, and, again, an incision of 6 mm.

long would not be big enough in cases of large scales in the vitreous to allow of easy extraction.

It is important before covering the wound with conjunctiva carefully to excise any prolapse of vitreous or choroid. A prolapse of vitreous is liable to be overlooked, and its appearance, like a shred of mucus adhering to the wound, while carrying out the subsequent dressing of the eyeball, is liable to be mistaken for mucus by the inexperienced.

With regard to the covering of the wound with conjunctiva. The cutting away of the conjunctival flap on one side of the wound, and the under-mining and sliding of the other over the wound is important, so that the line of conjunctival suture lies well away from the scleral wound.

Stitching of the scleral wound is bad practice, owing to the tough nature of the tissue, where to and fro movements accelerate the danger of detachment of the retina, and cause more hæmorrhage. Besides, it is quite unnecessary if the scleral wound is well covered with conjunctiva.

(*b*) When the wound was *recent* and *corneal*, and the foreign body resting in the vitreous.

It was in these cases that the giant magnet was most useful. By carefully manipulating the magnet, it was often possible to draw the metal through the circumlental space, perforating the zonule, into the anterior chamber, or even through the lens, if that had been already injured. As a rule, the lens was rarely injured in this attempt, and if it was found to be cataractous, that fact was noted before the magnet was applied. The large blunt point of the giant magnet was applied over the centre of the cornea in the first instance, and a weak, medium, or strong current used according to the effect first produced by the weak current. In some cases the metal shot right into the anterior chamber, the patient experiencing sharp pain. I have previously mentioned a case where no pain was felt, and unless the X-ray plate had demonstrated the presence of a chip of metal in the vitreous, its presence in the anterior chamber, after application of the magnet, might have been missed, owing to its small size.

If there was no result after the application of the strong current, two or three sudden " makes " and " breaks " of the current occasionally brought the metal forward. As soon as the iris began to bulge, the direction of the magnetic force was altered, so as to try to draw the metal under the iris into the anterior chamber. In some cases, where the metal had sharp edges, it did not move any further until a limbal section was made over the spot and an iridectomy done, when it was easily extracted by the hand magnet.

The "toilet" of an eye wound should be carefully attended to after extraction of the metal ; all prolapsed iris being excised, and the edges of the section wound being carefully freed from the iris, as one does after an ordinary cataract extraction.

In drawing the metal forward by this route, it may become fixed in the ciliary region, from which it may often be very difficult to dislodge. In case No. 28, for example, the foreign body came forward and became fixed in the ciliary region, and it was only on the third attempt, after a limbal section, with an iridectomy above, and the sharp-angled point of the magnet introduced into the ciliary region at the site of the foreign body, that the metal, a scale ½ mm. by ½ mm. was extracted. The eye did well, and the vision was 6/24.

Hirschberg[10] considers that the most difficult magnet cases are those where the foreign bodies become lodged in the ciliary region. Even the most powerful magnet will have very little power, as the resistance offered by the fibres in this region is very great. He describes a case where repeated attempts by the giant magnet were unsuccessful in drawing the metal, lodged in the ciliary region, into the anterior chamber. As the lens was cataractous, he did a limbal section, then an iridectomy at the site, and introduced the point of the magnet through the zonule, and the operation was successful. My own case was similar, except that no cataract was present or developed subsequently.

Another method adopted by some surgeons is to do a sclerotomy either near the foreign body, if it has been localised, or between the external and inferior recti muscles far back, if the foreign body has not been localised, and to insert the magnet point into the vitreous.

In a recent case I think this route should be avoided for the following reasons :—1. The risk of subsequent detachment of the retina at the site of the scleral wound. Haab[11] says that a scleral incision in these cases is highly undesirable, as it leads to detached retina. Although no detachment followed where a scleral incision was made to remove the foreign body in my own series of cases, yet two cases of retinal detachment occurred under the scar of the original scleral wound caused by the entering metal. 2. The risk of any prolapse of vitreous, however small, during the manipulation of the magnet is important, not so much because of the actual loss, but because the vitreous humour is a good culture medium for micro-organisms.

I would restrict the use of sclerotomy in corneal wounds with foreign body in the vitreous to the following conditions :—

(1) Where signs of anterior uveitis have already developed. To draw a piece of metal into the anterior chamber under these conditions is to open up fresh paths of infection. A scleral puncture after localisation was done, therefore, in case No. 42.

(2) Where the foreign body is in the vitreous, or sticking in the sclera at the back of the eyeball, and where external application of the magnet produces no result (See cases Nos. 2, 41, and 44).

(3) Where the foreign body has been in the vitreous several days. In a case of this sort the foreign body becomes fixed by organised exudate around it, and, not only is it more difficult to move by external application of the magnet over the cornea, but also the dragging of the metal, if it *does* move forward, produces considerable damage to the interior of the eyeball owing to its fixation in the tissues. In these cases it is better to localise the foreign body in the vitreous, perform a scleral puncture near the site, and insert a sharp point of the hand magnet, or of the giant magnet with reduced current, into the wound (See case No. 42).

(4) Where the foreign body was noticed with the ophthalmoscope to be embedded in the retina and sclera at any part of the globe.

The external application of the magnet was first tried to draw the metal into the anterior chamber. If this was not successful, then a scleral puncture near the site of the foreign body with insertion of the sharp point of the magnet was done. This procedure was carried out in case No. 2, but was unsuccessful, although the vision remained good, and no subsequent inflammation or detachment of the retina developed.

4. **Where the metal was suspected to be, or had actually been localized, behind the globe in the orbit.**

External application of the giant magnet in these cases is, as a rule, of no use. In many instances no pain was experienced; in others, an indefinite, dull, dragging pain was felt by the patient. In a case of this sort, the actual condition of the eye itself is of more importance than trying to explore the orbit for a foreign body, where it usually does little harm. For example, in case No. 54, signs of commencing panophthalmitis necessitated removal of the eyeball within twenty-four hours of the injury, and the foreign body, which was left embedded in the outer and posterior part of the orbit far back, caused no subsequent trouble.

Although I have described in a general way the methods which were adopted in different classes of cases, still one cannot lay down definite rules for individual cases, because, as difficulties may arise which prevent the carrying out of the plan which one had originally intended, another method may require to be adopted.

I must again insist on the most careful *technique* being adopted as regards asepsis, the careful covering of the corneal, ciliary, and scleral wounds with conjunctiva, and the excision of prolapsed iris and vitreous.

Where the eyelid has been split, the stitching of the gap is rather important. A suture was first inserted at the free margin of the lid, and this was not tied, but held taut by a nurse, while the other sutures were being inserted, the first suture being tied last of all. By so doing, the sutures can be put in correct apposition, so that the small but very noticeable indentation of the lid margin, so liable to follow the healing of a wound of this sort, was practically avoided.

After-Treatment.

I would describe the after-treatment of these cases under two periods, because I have noticed that, when we have to consider the question of enucleation of the eyeball, it generally happens during one of these periods, or after the second period.

The first period, which includes the first three or four days after the accident, I would notice the following class of cases as requiring enucleation:

(1) As mentioned previously, a hopelessly damaged eyeball should be removed straight away, and if there is a doubt whether removal is necessary or not, the patient's consent having been first obtained, the magnet should be applied under chloroform, and after the metal is extracted, it may be a question whether the eye should be removed at the same time, or whether one should wait a few days to give the eye a chance. In the latter case, a very few days will decide the issue, and one would adhere to the general principle that enucleation should be done if the eye has little or no vision.

(2) Where there is threatening panophthalmitis. As I shall mention later, the eyeball is not often destroyed by this kind of inflammation after removal of the foreign body. The usual way is by a slow iridocyclitis. If, on dressing the eye one morning soon after the magnet operation, there is more than the usual amount of chemosis of the conjunctiva, with perhaps exudate in the lips of the wound and a hazy anterior chamber, then I think it is better to remove the eyeball at once. If it is done at this stage, I do not think there is much likelihood of meningitis developing. In two cases of this kind (Nos. 24 and 54), a healthy socket was obtained by early removal of the eye, slow convalescence and pain being avoided. Of course, if the eye is seen at a later stage with pus in the anterior chamber and swollen eyelids, it is better to incise the eyeball and wait until the panophthalmitis has subsided, when the shrivelled stump can be removed, as done in case No. 8.

Opinions differ with regard to the question of enucleation in panophthalmitis. From a limited experience, I can only say that, provided enucleation was done at an early stage, no harm resulted.

(To be continued.)

CLINICAL MEMORANDUM.

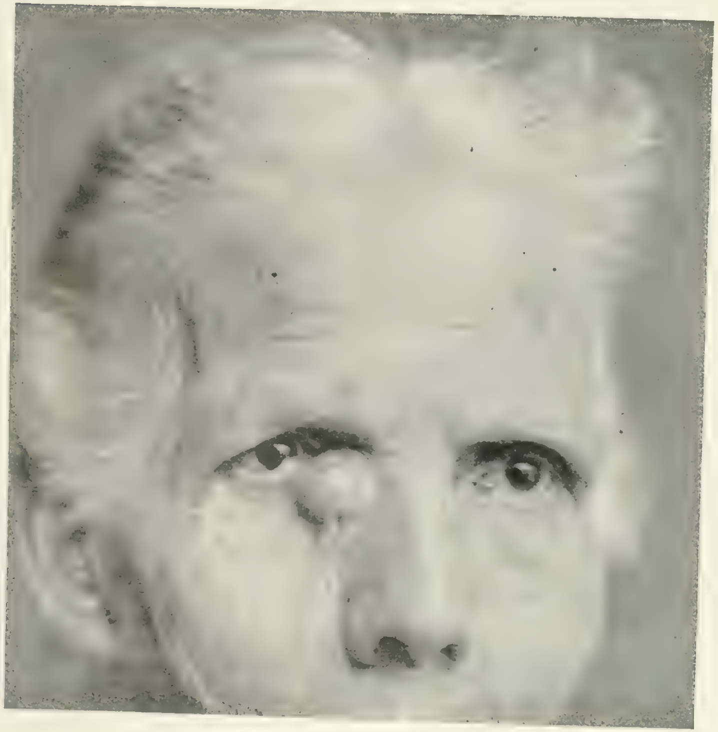
GIANT ECTASIA OF THE LACRYMAL SAC.

Excision : Cure.

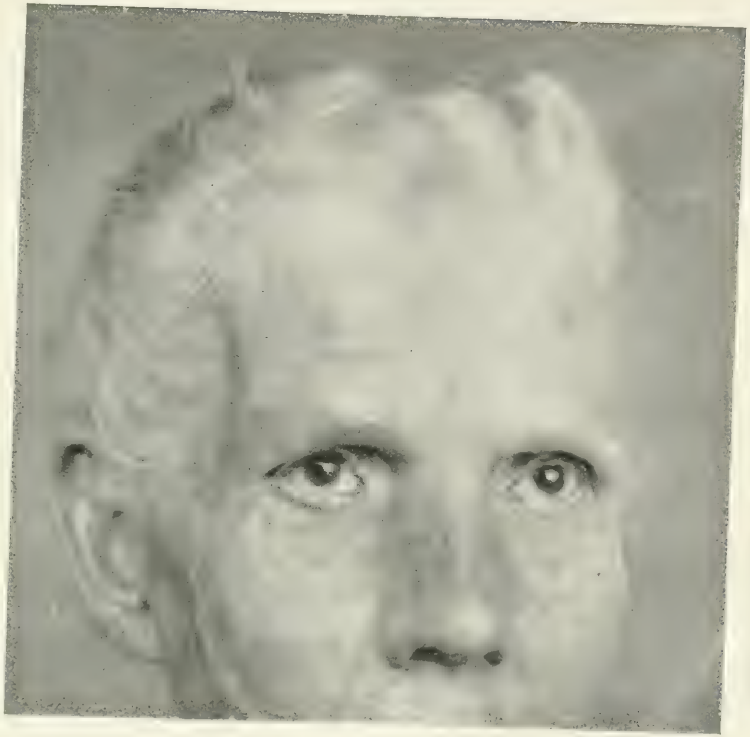
BY

SYDNEY STEPHENSON,
LONDON, ENGLAND.

Before Operation



After Operation.

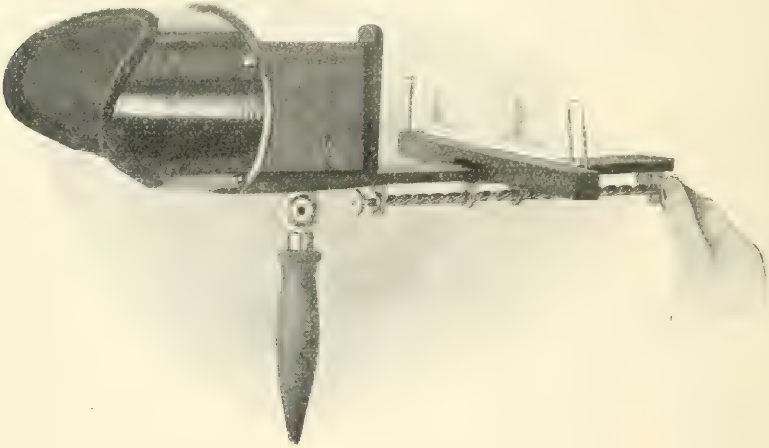


NOVELTIES.

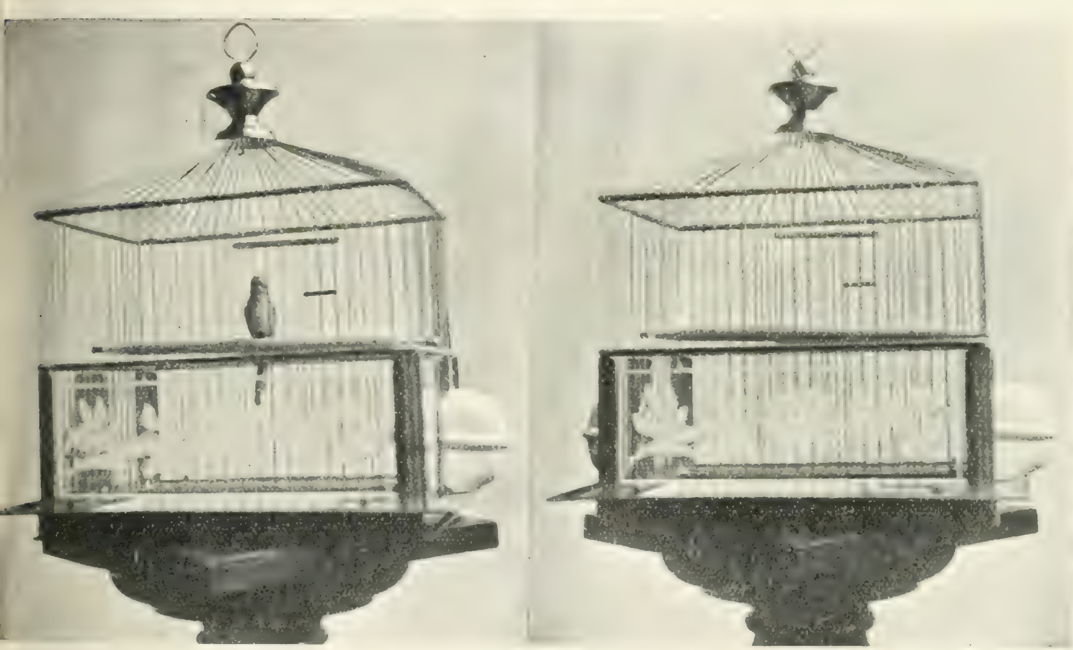
THE STEREOSCOPIC FUSION TRAINER.

BY
A. A. BRADBURNE, F.R.C.S. Ed.,
MANCHESTER, ENGLAND.

THE appended electrotype is an illustration of an adaption to the stereoscope which Messrs. Armstrong, of Deansgate, Manchester, have made at my suggestion. It consists of an endless screw which can be turned by a milled thread, the action of which moves the picture carrier backwards or forwards. By this means the ability to maintain binocular vision can be trained and cultivated. Its sphere of application is in that period of the training of squinters which follows that obtained by Worth's amblyoscope ; that is, when binocular control of the two eyes has been obtained, whilst the sense of stereoscopic vision has not been educated. This instrument comes to bridge a hiatus in the treatment ; for, however highly we train the binocular control, unless we awaken the mind to the reality of stereoscopic vision, the cure cannot be considered as complete. Worth's instrument, in that the pictures are transparencies, cannot educate the stereoscopic faculty, and it further necessitates supervision by one skilled in its use. This instrument can be used at home by parents or teachers, and by this means other treatment is supplemented during a period when, under ordinary circumstances, the lessons learnt at the amblyoscope are apt to be forgotten.



The adaptation was originally designed for use with Krolls' pictures, but in that these pictures were not stereoscopic, they lacked the chief essential, and being of German make, cannot now be obtained. To overcome this difficulty I have made a series of pictures for use in the stereoscope, which are truly stereoscopic, and also differ in slight essentials in one or both ; *which feature affords the stimulus to fuse* which patients with a defective fusion faculty require. Ordinary stereoscopic pictures possess a stimulus to blend from the special manner in which they are taken and presented to the observer; they furnish a view which the educated centre knows by experience is only obtainable by solid objects. Now, the squinter has never learnt this faculty,—binocularly; he knows of depth and perspective only as a one-eyed man does, and hence his faculty cannot be stimulated by ordinary stereoscopic pictures. He needs a stronger stimulus, and this he receives when he sees a part of one picture missing and a part which is essential to the completion of the picture. For instance, in the accompanying example the observer realises from common experience what a bird in a cage is. Hence he will fuse the one with bird with the one without it. Were the bird in both cages, he would be under no need to fuse, as the completed picture would be presented complete to him, and he would see no reason to blend it with its fellow. As, however, from the manner in which the photograph of the cage has been taken and its manner of presenting it to his vision where the respective sides are reversed, he will after practice become aware of a certain property, *viz.*, that of solidarity or depth which he has been totally unaware of before.



This feature regarding the nature of the stimulus to fusion is a peculiarity which has doubtless thrust itself on the observation of other workers in this line. Although a horse and its rider will stimulate to binocular vision, a horse in a cart has but little effect. In addition to its employment in squinters, the instrument can be used for training defective adductive or abductive powers, supplemented by, if needed, the use of prisms on the observer's face. In one instance its use proved useful in an adult who complained that for years she had suffered from sick headaches and bilious attacks whenever she attended places where there was much movement of people, such as watching cricket or tennis matches, or at race-meetings, or after a day's shopping. Examination showed she was anisometropic, for which she has been given correct glasses, but which she wore only for near work. When tested for the presence of stereoscopic vision by Sir Alfred Greenhall's pictures, it was shown to be absolutely wanting, hence the unconscious mental diplopia which caused confusion when in a crowded moving situation. She was told to use the fusion trainer steadily whilst wearing her glasses, and in time she would be able to hold her visual axes sufficiently to prevent them separating, as they were only too ready to do when the objects gazed at moved.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—OPHTHALMOLOGY AND GENERAL MEDICINE.

(Sixth Notice.)

(1) **Lataillade.—Paralysis of the two external recti and of accommodation of diphtheritic origin. Rapid cure without treatment. (Paralysie des deux droits externes et de l'accommodation d'origine diphthérique. Guérison rapide sans traitement.)** *Ann. d'Oculistique*, août, 1913.

(2) **Smith, Elsworth.—Relation of general arterio-sclerosis to certain ocular conditions.** *Annals of Ophthalmology*, January, 1914.

(3) **Mayou, M. S.—Optic neuritis with symmetrical loss of the lower portion of the field associated with diabetes.** *Proceedings Royal Society of Medicine: Section of Ophthalmology*, Vol. VII, July, 1914.

(4) **Layson, F. C.—Conjunctival hæmorrhage in typhoid.** *Ophthalmic Record*, July, 1914.

(5) **Brose, L. D.—Ophthalmoplegia interna, the result of lead poisoning.** *Arch. of Ophth.*, Vol. XLIV, No. 1, January, 1915.

(1) **Lataillade**, of Paris, records the case of a girl, aged 10 years, who, five weeks after a mild attack of diphtheria, developed paralysis of both external recti and of accommodation. Under treatment with "tonics," the paralysis of the recti disappeared suddenly in a week and two days, and later the patient was able to read No. 1 of de Wecker's test types at 15 c.m. with the lens required to correct slight hypermetropia (1 D.).

R. J. COULTER.

(2) **Elsworth Smith**, of St. Louis, has put some old facts in an interesting and instructive form, in tracing the boundary line where the internist and ophthalmologist meet in their studies of arterio-sclerosis and of its effects on the eye. The advice he gives on one subject is so sound as to deserve repetition. It is that "when the conditions in the eye are so grave as to threaten the integrity of the organ, the patient should be immediately placed at complete rest in bed, but, that if the condition be not urgent enough to demand complete rest in bed, then the patient should be urged to pursue the even tenor of his way, free as possible from all sources of worry and strain."

R. H. ELLIOT.

(3) **Mayou,** of London, reports an interesting case which is practically synopsised in the title. The only complicating point is that there was a septic antrum at the time the right eye was affected, but when the left eye became affected seven months later, the nasal trouble had been cured. Mayou does not state which was the diseased antrum. In any case no improvement in the field occurred as the result of the nasal treatment. The author regards the case as one of interstitial neuritis. ERNEST THOMSON.

(4) **Layson,** of Hinton, W.Va., observed conjunctival hæmorrhage in a patient, aged 25 years, who suffered from typhoid fever with repeated hæmorrhage from the nose, intestine, and kidneys. Plugging of the nares for epistaxis was followed by hæmorrhage in the conjunctival sac. This bleeding arose from the conjunctiva of the upper lid and was capillary and profuse but was controlled by moderate pressure. The hæmorrhage stopped after the administration of normal horse serum hypodermically. At a later date, the remains of four small hæmorrhages were seen in the retinæ. There was no history of a hæmorrhagic diathesis. J. JAMESON EVANS.

(5) **Brose,** of Evansville, Ind., publishes the notes of a case of paresis of the ciliary muscle, occurring as a consequence of lead poisoning, and offers some observations on the previous records of eye complications met with in this intoxication. He lays great stress on the rarity of this form of trouble in plumbism. R. H. ELLIOT.

II.—THE NEUROLOGY OF THE FUSION FACULTY.

Burkholder, J. F.—The neurology of the fusion faculty. *Ophthalmology*, June, 1914.

Burkholder, of Chicago, deals with his subject from the developmental and anatomical standpoints. Phylogenetically, the corpora quadrigemina come first, later the external geniculate bodies, and, lastly, the occipital cortex ; as the two latter structures become active, the colliculi superiores lose their functions in connection with vision, but retain the reflex mechanisms necessary for orientation of the eyeballs. During the evolution and development of the higher visual faculties, an intimate association is established between the colliculi and the occipital cortex, and thus the co-ordinating activities between the two assume a most intimate character. The cortex of the occipital lobe has a double function to perform : (1) the interpretation of visual sensations, and (2) the presidence over the workings of the fusion faculty, whereby the finer adjustments of the extrinsic muscles of the eyeballs are regulated.

The paper is profusely illustrated with excellent drawings, but the value of these is markedly diminished by the want of explanatory foot notes to each. It also suffers from over-condensation, and from occasional obscurities of expression. It would be ungracious to notice these points, were it not that the author's material would justify the belief that the value of the communication might be greatly enhanced if it were re-written in a considerably enlarged form. R. H. ELLIOT.

III.—EYE-STRAIN.

(1) **Lancaster, Walter B.—Eye-strain and ocular discomfort from faulty illumination.** *Annals of Ophthalmology*, April, 1913.

(2) **Mayeda, U.—Neurasthenia originating in anomalies of refraction. (Die auf dem Boden von Refraktionsanomalien entstandene Neurasthenie.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(3) **Kabar, W. W.—Faulty vision as a factor in ill-health.** *Canada Lancet*, January, 1915, and *Medical Press and Circular*, February 10th, 1915.

(4) **Jones, Edward W.—The relation of ophthalmology to general practice.** *New York State Journal of Medicine*, April, 1915.

(1) This article by **Lancaster,** of Boston, is both thoughtful and suggestive, and a perusal of it in the original will well repay any ophthalmologist. He points out that the tendency of our profession is to focus too much attention on the influence of intense light on the eye, whilst ignoring the much more important (from a social and economic point of view), because vastly more prevalent, harm done by faulty illumination. He discusses in turn the quantity, the quality, and the distribution of the light used for working purposes. As to the quantity, he says that while it is important to regulate this, yet the necessity of so doing is sufficiently obvious to prevent much harm being done in the majority of cases. Quality is of importance æsthetically, and on grounds of efficiency, but has not been proved to be so as a factor in causing eye-strain. Distribution is of the very greatest moment ; exposed lights should be avoided ; a light from below is worse than one from above ; glare, by reflection from the paper or from the work, should be avoided ; troublesome shadows should be eliminated. The indirect method of lighting rooms is warmly praised, as is also the subdivision of the source of light. The cause of the pain and discomfort experienced by those who work under faulty illumination is interestingly discussed under the headings (1) excessive muscular effort, and (2) hyperæmia of the conjunctiva. This section of the paper is as suggestive as it is interesting. The kernel of the argument lies in the explanation that work by deficient illumination demands an amount of fixation greatly in excess of that which is called for under ordinary circumstances. This contention is worked out in a very interesting manner. The paper closes with practical advice as to the home management of our asthenopic patients. R. H. ELLIOT.

(2) **Mayeda**, of Nagoya, Japan, believes that not only is neurasthenia in some cases the cause of eye symptoms, but also in many cases it is the result of errors of refraction, and may be relieved by wearing appropriate glasses. A. J. BALLANTYNE.

(3) **Kabar** eulogises the work done by George M. Gould in trying to bring home to the medical profession the evil results of eye-strain. A few illustrative cases from the author's practice are related. If we wished to be critical, we might take exception to the title of Kabar's communication, since it is not "faulty vision" that matters so much as good, or relatively good, vision that can be obtained only by a strain upon the resources of the eye and nervous system. SYDNEY STEPHENSON.

(4) **Jones,** of Watertown, N.Y., lays it down as an aphorism that

"abnormal physiology is the origin of most pathology," and states that "the prevention of this morbid physiology by proper glasses prevents from 75 to 90 per cent. of all inflammatory and surgical diseases of the eyes." His general attitude towards the question may be gathered from his statement, as follows:—"In fact, there is almost no disease which the physician is called upon to treat that may not be due to or influenced by eye-strain." The communication ends by advocating that the eyes should be treated by the general practitioner of medicine, and by a slashing attack upon the so-called "optometrist." SYDNEY STEPHENSON.

IV.—THE CONJUNCTIVA.

I.—Inflammatory Affections.

(1) **Terson, A.—The ocular lesions of erythema multiforme: erythema nodosum and tuberculosis. (Lésions oculaires de l'érythème polymorphe; érythème noueux et tuberculose.)** *Société Belge d'Ophtalmologie*, 28 avril, 1912.

(2) **Sulzer.—On the ocular localisations of xeroderma pigmentosum. (Des localisations oculaires du xéroderma pigmentosum.)** *Ann. d'Oculistique*, juillet, 1913.

(3) **Falchi, Franz.—Ophthalmia in the form of conjunctival patches.** *Archives of Ophthalmology*, July, 1913.

(4) **Bordley, James, Jr.—A case of pemphigus of the conjunctiva.** *Ophthalmic Record*, September, 1913.

(5) **Keiper, G. F.—A further report on Parinaud's conjunctivitis.** *Ophthalmic Record*, March, 1914.

(6) **Weekers.—Syphilitic gummatous infiltration of the conjunctiva.** *Société Belge d'Ophtalmologie*, 26 mai, 1914.

(7) **Brown, Samuel Horton.—Herpes simplex affecting the palpebral and bulbar conjunctiva, simulating lues.** *American Journal of Ophthalmology*, May, 1914.

(8) **Boulai and Collet.—Parinaud's conjunctivitis. (Conjonctivite de Parinaud.)** *La Clinique Ophtalmologique*, 10 juin, 1914.

(9) **Gallenga, C.—Ætiology of trachoma. (Etiologia del tracoma.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(10) **Walter, O.—The ætiology of trachoma. (Zur Aetiologie des Trachoms.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(11) **Kraus, C. A.—Trachoma in the schools of Baku. (Trachoma v. Bakeenskeech shkolach.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(11A) **Thienpont.—Ophthalmia nodosa. (Ophtalmia nodosa.)** *La Clinique Ophtalmologique*, 10 septembre, 1914.

(12) **Harrison, W. H.—Trachoma amongst the Indians of the United States of America.** *Ophthalmology*, October, 1914.

(13) **Lloyd, B. J.—Contagious and infectious diseases among the Indians.** *Ophthalmology*, October, 1914.

(14) **Phillips, O. S.—Trachoma on the Blackfeet reservation.** *Ophthalmology*, October, 1914.

(15) **Bedell, Arthur J.—A case of chronic sporotrichosis of the eye.** *Annals of Ophthalmology*, October, 1914.

(16) **Williams. Anna Wessels.—Causes and treatment of chronic conjunctival affections in childhood.** *New York State Journal of Medicine*, December, 1914.

(17) **Sattler, Robert.—Acute** (*Bacillus Tularense*) **conjunctivitis.** *Archives of Ophthalmology*, May, 1915.

(1) According to **Terson**, of Paris, the various forms of erythema produce singular lesions of the eye. The papular variety gives rise to enormous elevations (*bosselures*) of the conjunctiva symmetrically placed in the exposed part of the eyeball. These violaceous elevations appear and disappear in a few days without leaving traces. In erythema nodosum the ocular nodosities are even more dense, disappearing much more slowly and relapsing easily, in which respects they resemble the parent malady. Terson reports a case of erythema nodosum which affected the eyebrows and the two eyes of a tuberculous subject. It is known that erythema nodosum is often met with as a precursory or concomitant sign of tuberculosis, and that malady should always be searched for. The author also narrates a case of sclerosing keratitis which appeared without other lesion of the eye in a tuberculous subject affected with macular erythema.

In hydroa there may be enormous bullæ upon the mucous membranes (mouth, lips, and tongue), as well as upon the conjunctiva. This affection is usually cured without corneal complications and without retractile cicatrices of the conjunctiva. One should then establish with care the diagnosis between bullous hydroa, harmless as regards the eye, and pemphigus, so grave and ending in symblepharon and blindness.

Terson notes that these various ocular manifestations were little known before the communications which he published fifteen years ago, and the thesis of Beaudonnet (1894), which he inspired. He cites the works which have appeared since then, and ends by recalling a case of acute glaucoma, attacking each eye in turn, during the first days of an outbreak of relapsing erythema nodosum. MARCEL DANIS.

(2) **Sulzer,** of Paris, has had under his care two cases of xeroderma pigmentosum with unusual ocular lesions. These consisted of conjunctival vascularisation of the shape of pterygium with pigmented spots at the limbus resembling phlyctens, circumscribed pearl-shaped corneal infiltrations, and diffuse corneal infiltration. The presence of small round pigmented cells in circumscribed corneal infiltrations showed them to be xerodermic lesions, but the author considers that the diffuse corneal infiltration may have been an unimportant secondary lesion, due to loss of protection owing to deformity of the eyelids. R. J. COULTER.

(3) **Falchi**, of Pavia, reports a case of ophthalmia occurring in patches that differs essentially from other forms of conjunctivitis. The attack commences with fever and this is followed by hyperæmia of the conjunctiva and the formation of white patches on the tarsal and bulbar conjunctiva and

on the fornix, on the complete development of which the hyperæmia disappears. The white patches take eight to twelve days to reach full development; during eight to twenty days they remain stationary; and retrogression follows during a further twelve days. The patches do not ulcerate, nor does desquamation or shrinking occur. During five years, relapses occurred two or three times a year, mostly in the winter, and generally when the patient, a woman of 22 years, was in a "run down" condition.

Histologically, a degenerative condition of the epithelium and subepithelial tissues was found. Treatment was by the use of antiseptics and a permanent bandage during the stage of development. Operative removal of a single patch was followed by absence of relapse for two years, but if there are several patches it is not wise to remove any, as new patches form in the neighbourhood. Pain was combated by cocaine, photophobia by pilocarpine, and quinine and arsenic were given internally. Rosa Ford.

(4) **Bordley**, of Baltimore, records a remarkable case of pemphigus in which there were extensive subconjunctival hæmorrhages confluent in the bulbar part and discrete in the palpebral conjunctiva. Bathing with a solution of zinc sulphate and inunction with boric ointment cleared the hæmorrhages.

The conjunctiva remained intact, the cornea remained clear, and vision was not affected. Bullæ appeared only on the skin margin of the lower lids. They quickly ruptured, and the resulting ulcers quickly disappeared under the treatment above mentioned.

Salvarsan, sodium cacodylate, baths, dry treatment, ointments, vaccines from fluid in the bullæ, and from anaerobic cultures on human muscle (Noguchi and Flexner), were powerless to prevent the death of the patient, which occurred about four months after the onset of the disease.

J. Jameson Evans.

(5) **Keiper,** of Lafayette, Ind., reports two cases of Parinaud's conjunctivitis and refers to the literature of the subject.

In one of his cases a histological and bacteriological examination of an excised piece of the granulations was made. The tissue was suggestive of a mixture of old granulative tissue showing hyaline degeneration and actively growing tissues of spindle cells and delicate fibres. The blood-vessels were somewhat scanty, and showed cloudy swelling of the endothelium. The cellular elements of the interstitial tissue consisted of small lymphocytes with few plasma cells and practically no polymorphonuclear elements. It was thought that a leptothrix could be seen, but three other observers could not find it, whereas two men saw numerous cocci which two others were unable to find! In the second case the bacteriological findings were negative.

The writer treated the cases by the daily application of a two per cent. solution of silver nitrate to the everted lids and gave the patient drops of zinc phenolsulphonate (gr.i. to ℥i) for home use, and also employed bathing with hot water for five or ten minutes every hour. The enlarged glands were relieved by dry heat. Calomel and quinine were given internally.

J. Jameson Evans.

(6) The following case was exhibited by **Weekers**, of Liège.—A woman, aged 59 years, presented thickening and swelling of the bulbar conjunctiva, especially around the limbus. A nodosity, adherent to the globe, lay in the superior cul-de-sac. The cornea was cloudy, its sensibility was diminished, and keratitis punctata was present. Wassermann was positive. Some little time later, the patient succumbed to pneumonia. The anatomical examination showed that there was a gummatous infiltration of the conjunctiva, and that the nodosity observed during life was a syphilitic gumma.

Marcel Danis.

(7) The diagnosis in the case reported by **Brown,** of Philadelphia, was arrived at only after the exclusion of syphilis by the Wassermann reaction. When the very great initial swelling of the eyelids had subsided, it was found that there was a small ulcer at the lower-outer margin of the cornea, several apparently ruptured vesicles on the lower bulbar and palpebral conjunctiva, and one large ruptured bleb on the palpebral conjunctiva of the lower lid near the inner canthus. This latter lesion was indurated at the edges and base. S. E.

(8) **Boulai,** of Rennes, and **Collet**, of Montfort, report a case having all the clinical characteristics of Parinaud's disease. There was no history pointing to tuberculosis. No bacteriological investigation was made. S. E.

(9) The researches of Italian workers, according to **Gallenga,** of Parma, convince them that the Chlamydozoa of Prowaczek and Halberstädter are characteristic of trachoma and stand to it in an ætiological relationship. A. J. BALLANTYNE.

(10) As the result of thirty years' experience in a trachomatous region, **Walter**, of Odessa, has come to the conclusion that trachoma is not a disease *sui generis*, but expresses the reaction of the conjunctiva to various irritants. There must be a certain bodily disposition, which he calls the "lymphatic." Only when the excitor is of an infective character does the trachoma become contagious. He holds that the same infective agent, for example, the gonococcus, can produce in one case an acute catarrhal conjunctivitis, in another, or even in the other eye of the same patient, trachoma. The "lymphatic" disposition may be produced by poor hygienic and social conditions, or by syphilis and tubercle. A. J. BALLANTYNE.

(11) The conclusions appended to this paper by **Kraus,** of Baku, are as follows.—Trachoma is endemic in Baku. It has existed there from prehistoric times, and has not been imported by immigrants. The chief sufferers are the Tartar natives. It is less common among the incoming races, Russians and Armenians. Its distribution is in inverse ratio to social status and to height above sea level. It is most common in infants and in them it often disappears leaving no cicatrices. In schools the earlier' classes show chiefly the first and second stages of trachoma, while in the older scholars it is found chiefly in the cicatricial form. The family and not the school is the breeding ground of trachoma. A. J. BALLANTYNE.

(11A) **Thienpont,** of St. Nicolas, Belgium.—Ophthalmia nodosa incurred by squeezing a caterpillar, the juice entering the eye. Although the caterpillar hairs could not be seen at the time, they were found on examination of the three nodules which were situated on the upper tarsal conjunctiva; the nodules having been excised. The author says that the situation on the upper tarsal conjunctiva has not, so far as he knows, been previously reported. The eyeball itself was not penetrated by the hairs in this case. ERNEST THOMSON.

(12) **Harrison**, of Missoula, Montana, deals with the subject of trachoma in general. Under the heading of treatment, he lays the greatest stress on the method of "expression" followed by the use of copper sulphate. For anæsthesia before "expression" he applies 4 per cent. cocaine, followed by four or five applications of 10 per cent. cocaine at intervals of four minutes, taking care to get it well up into the fornices. After "expression," he says, the comfort of the patient is secured by a series of hot wet compresses, 110 to 115 degrees Fahr., at two minute intervals for thirty minutes. He sees in all successful measures for the treatment of trachoma merely measures which induce at short and regular intervals an active hyperæmia of the affected tissues. Whatever methods are employed, they must be continued until the conjunctiva returns to the normal. A. J. BALLANTYNE.

(13) This paper by **Lloyd**, of Seattle, deals briefly with smallpox, enteric fever, measles, whooping cough, diphtheria, mumps, scarlet fever, etc., as found among Indians on the reservations. Speaking of trachoma, he gives 10 to 16 per cent. as the frequency of incidence among the Indian population of the United States. A. J. BALLANTYNE.

(14) **Phillips**, of Lapwai, Idaho, deals with the prevalence of trachoma among the Indians of the Blackfeet reservation, a tract of country three thousand square miles in extent, east of the Rockies and just south of the Canadian frontier. The population consists of 2,700 Indians, mostly of mixed blood. The housing and other conditions are favourable to the propagation of trachoma and tuberculosis, and 20 to 25 per cent. of the population are trachomatous. The author describes the methods recently introduced for dealing with the disease, and emphasizes the benefit to be derived from the systematic examination and treatment of the children in the "boarding schools," who are affected to the extent of from 10 to 52 per cent. with trachoma. A. J. BALLANTYNE.

(15) **Bedell**, of Albany, furnishes the notes of a case of sporotrichosis of the conjunctiva, the canaliculi, and the sac, in a man, aged 49 years. The diagnosis was confirmed by cultures after treatment had been started. The entire conjunctival surface was painted daily with tincture of iodine, and potassium iodide was freely exhibited. Recovery was uneventful. A full report of the cultures is given ; the organism showed marked differences from any of the previously described varieties. The bibliography of the subject is appended. R. H. ELLIOT.

(16) **Anna Williams**, of New York City, has come to the conclusion that "trachoma inclusions are simply nests of growing bacteria in the epithelial cells of the conjunctiva under certain conditions, hæmoglobinophilic bacilli in some cases, gonococci in others, and possibly a few other bacteria in others."
SYDNEY STEPHENSON.

(17) In 1914, Derrick T. Vail, of Cincinnati, described a case of acute conjunctivitis, affecting one eye, in a man of twenty-eight years, due to local inoculation with the *Bacillus tularense*, the organism shown by McCoy and Chapin to be the cause of so-called "squirrel plague," an affection believed to be identical with bubonic plague (for abstract see THE OPHTHALMOSCOPE, February, 1915, p. 89).

Sattler, of Cincinnati, now reports the second known case of this form of conjunctivitis, in a woman, aged 43 years. Without known cause, the patient's left eye became inflamed, the neighbouring glands got markedly swollen, and the woman developed feverish symptoms. When seen by Sattler within twenty-four hours of the commencement of the attack, there were seven infiltrated spots, resembling ruptured pustules, upon the palpebral conjunctiva, which was œdematous. Temperature, 104°F. On the next day the symptoms were worse. The eyelids were tense and glossy, and the condition of the face and neck suggested acute erysipelas, more especially as high temperature, excessive prostration, profuse perspiration, and delirium were present. The preauricular, submaxillary, and cervical glands were enlarged. The discharge from the eye was not profuse, and at no time was it distinctly of a purulent nature. It is described by the author as "a constant, although moderate, flow of straw-coloured watery mucus." Repeated attempts to discover organisms in smears from the discharge, as well as from scrapings from the conjunctiva, were negative. The patient made a slow recovery, extending over a period of five weeks, and it is noteworthy that the eye symptoms disappeared before the constitutional ones However, what is described as "a distinct lymph ectasia or caseated node in the course of a dilated and transparent lymph channel," is stated to have persisted in the ocular conjunctiva. This node, which was of yellowish colour, and about the size of a barley grain, was excised. A curious thing then happened. The little operation was at once followed by the same local and constitutional symptoms as at first, so that within twelve hours of the intervention, there was a return of the complete clinical picture present at the beginning of the attack. These appearances subsided within two weeks.

Some of the secretion from the inflamed eye was mixed with 0·85 per cent. solution of sodium chloride, and injected intraperitoneally into a guinea-pig. Death in six days. Dissection showed lesions resembling those known to be produced by the *B. tularense*. Smears from liver and spleen showed organisms resembling the same organism. Cultures obtained within twenty-four to forty-eight hours on coagulated hen's egg yolk. This culture inoculated into a needle prick in the conjunctiva of a rabbit, set up, within forty-eight hours, marked œdema and copious purulent discharge, and the animal died on the fifth day.

The examination of a "small glandular node removed from near the left canthus," however, showed that it was in the nature of a granuloma, without giant cells. Inoculation into a guinea-pig negative.

SYDNEY STEPHENSON.

2.—Chemical Injuries.

(1) **De Micas.**—Cauterisation of the conjuctiva with silver nitrate from the medico-legal point of view. (Les cautérisations conjonctivales par le crayon de nitrate d'argent au point de vue médico-légal.) *L'Ophtalmologie Provinciale*, mai, 1913.

(1) **De Micas** discusses from a medico-legal point of view, the case of a young law student who had his conjunctiva touched with a pencil of silver nitrate. He had suffered for some time from a chronic conjunctivitis, and had been treated by several oculists with various kinds of drops; on one occasion the conjuctiva was touched with a crystal of sulphate of copper. As he seemed to derive no benefit from the usual forms of treatment, his medical practitioner suggested that the mucous membrane should be cauterised with solid silver nitrate. No cocaine was instilled, the entire palpebral conjunctiva was touched with the caustic, this was followed by *lavage* with solution of sodium chloride. The patient suffered intense agony for three days. It was then discovered, on examining the eyes, that the conjunctivæ were turgid and chemosed, and the corneæ opaque in their entire extent and ulcerated in the lower part on the right side. For some time afterwards, he complained of headaches, orbicular neuralgia, and there was considerable diminution of vision. He brought an action against his doctor, and was awarded damages to the extent of 20,000 francs.

De Micas discusses the case under the following headings:—

(1) Judicial opinions concerning the responsibility of medical men with regard to diagnosis.

(2) The *technique* of cauterisation of the conjunctiva with the silver nitrate pencil.

(3) The relationship between the severity of the injury and the size of the indemnity.

P. A. HARRY.

3.—Parasites.

(1) **Petit, Paul.—Subconjunctival filaria (filaria loa). [La filaire sous-conjonctivale (filaria loa).]** *Ann. d'Oculistique*, mai, 1911.

(1) **Paul Petit,** of Rouen, gives the histories of two cases of subconjunctival filaria loa :

In the first, which occurred in his own practice, the patient saw a worm wriggling about under the skin at the bend of his right elbow six months after his return from a stay of three years on the Congo. The worm disappeared before he could reach a doctor. He had no further trouble for about eight years, when he felt discomfort in his left eye and noticed a similar worm wriggling about under the conjunctiva. It went away again, but kept reappearing and disappearing beneath the conjunctiva or in the eyelids on either side, usually the left, for about five months, when it came in the left eye and caused so much discomfort that the patient consulted Petit, who saw beneath the conjunctiva an elongated actively undulating body. This was removed and was identified by M. Mesnil, of the Institut Pasteur, as a filaria loa. Six months later, a similar worm was removed from the patient's right eye.

In the second case, which was under the care of Morax, a man, aged 23 years, who for two years previously had suffered from filariosis, contracted in the Soudan, felt an irritation in his left eye and went to the Lariboisière, where Morax found beneath the conjunctiva of the left eye, which was slightly injected, a small elongated sinuous body slightly raising the conjunctiva and distinctly undulating. While the patient was being prepared for operation, the worm disappeared, but in about an hour it reappeared, when it was seized along with the overlying conjunctiva in a forceps and extracted through a buttonhole incision. The parasite was identified by M. Mesnil as a filaria loa.

The communication concludes with a review of the literature of the subject.

R. J. COULTER.

4.—Neoplasms.

(1) **Stoll, K. L.—A case of multiple double lipodermoids of the conjunctiva and cornea, accompanied by intrabulbar and other anomalies.** *American Journal of Ophthalmology*, January, 1913.

(2) **Cob.—Lymphangioma of the ocular conjunctiva taking the form of a Haemangioma. (Lymphangiom der Bindehaut des Augapfels unter dem Bilde eines Haemangioms.)** *Zeitschrift für Augenheilkunde*, February, 1913.

(3) **Cross, F. Richardson. — Pigmented growth of conjunctiva.** *Proceedings of the Royal Society of Medicine*, June, 1913.

(4) **Mayou, M. S.—Angioma of the conjunctiva.** *Transactions Ophthalmological Society U.K.*, Vol. XXXIII, 1913.

(5) **Alt, Adolf.—Two cases of nævus of the conjunctiva bulbi.** *American Journal of Ophthalmology*, October, 1913.

(6) **Steiner, L.—Pigment spots and pigmented tumours of the conjunctiva in different races. (Pigmentflecke und Pigmentgeschwülste der Bindehaut, bei verschiedenen Rassen.)** *Klin. Monatsbl. f. Augenheilkunde*, Oktober-November, 1913.

(7) **Jessop, Walter H.—Sarcoma of the conjunctiva.** *Trans. Ophth. Society U.K.*, Vol. XXXIV, 1914, p. 100.

(8) **Gros, Fr.—Upon multiple cysts in the tarsal conjunctiva. (Ueber multiple Cysten in der Conjunctiva tarsi.)** *Zeitschrift für Augenheilkunde*, März, 1914.

(9) **Luedde, W. H.—Simple and multiple papillomata of the conjunctiva.** *American Journal of Ophthalmology*, March, 1914.

(1) The enormous wealth of detail, clinical, operative, pathological, and bibliographical, incorporated in his description of a most interesting and rare case, render the article by **Stoll**, of Cincinnati, impossible to abstract usefully. The operative *technique* is illustrated by sketches. The author sums up the interesting points in his case in no less than fourteen paragraphs.

ERNEST THOMSON.

(2) **Cob**, of Lugano, describes a case of lymphangioma, which was for a time improved by electrolysis. The use of dionine produced enormous swelling of the conjunctiva, which quite hid the cornea. The appearance of the eye is shown by a woodcut.

T. HARRISON BUTLER.

(3) **Cross**, of Bristol, showed a case, the notes of which may be transcribed here.—A man, aged 36 years, presented a "brownish thickening of the conjunctiva on the inner side of the left eyeball, slightly overlapping two-fifths of the edge of the circumference of the corneal margin to the extent over it of about 1½ millimetres. The growth measures 1½ cm. vertically and 1½ cm. horizontally. The swelling passes in a triangular shape, with its apex at the caruncle, which is not involved. The growth is separated from the corneal tissue by an arcus senilis." From a small spot at birth the growth had increased to its present size, having apparently been stimulated by a burn of the eye when the patient was aged 24 years. The growth was mainly conjunctival and free of the sclera.

In the discussion **Sir A. Critchett, L. Paton**, and **J. B. Lawford** all took a grave view of the case. The two latter evidently considered that as the growth was probably a melanotic sarcoma, the eye should be removed along with it. Lawford suggested, short of radical operation, the tentative use of radium.

ERNEST THOMSON.

(4) The angioma of the conjunctiva removed by **Mayou**, of London, was clinically a red pulsating growth, freely movable, and made up of convoluted vessels. Sections showed spaces lined by epithelium containing blood corpuscles. There was no evidence of the tumour being derived from pre-existing vessels.

ERNEST THOMSON.

(5) This article, by **Alt**, of St. Louis, should be read in the original.

(6) While nævus pigmentosus is rare in Europe and is liable to undergo malignant transformation, being for that reason removed early when possible, **Steiner**, of Java, finds that among the dark-skinned races it is different. Among the Javanese, pigmentation of the conjunctiva is quite common. It takes the form of a general brown discoloration of the bulbar conjunctiva, combined with the presence of larger or smaller, more or less well-defined, pigment spots. It is seen in its best developed forms in old persons who have worked much in the sun. Similar pigmentation may appear in the course of time in the exposed conjunctiva of an ectropionised lid. In spite of the frequency with which conjunctival pigmentation appears in these peoples, the author has not in the course of twenty years' practice in Java, seen a malignant pigmented tumour of the conjunctiva. He does not contend that the fear of pigmented structures in the conjunctiva among European surgeons is

unreasonable, but he thinks it is well that those who may have to treat members of the coloured races, like the Javanese, Japanese, Chinese, Negroes, etc., should understand that the conditions there are different.

A. J. BALLANTYNE.

(8) **Gros**, of Mayence, after alluding to a case of multiple cysts in the tarsal conjunctiva, published by Vossius, describes two more cases. The appearance of the lid is made clear by a coloured plate, and the histology by a microphotograph.

T. HARRISON BUTLER.

(9) **Luedde**, of St. Louis, reports a case of (1) papilloma of the caruncle, and (2) multiple papillomata. In the latter the growths were situated as follow: the largest was at the margin of the lower lid, and projected through the palpebral fissure; it measured 5 mm. in its longest axis. Its base was just within the conjunctiva, at the free margin of the lower lid, and measured 2 mm. Three were situated on the palpebral surface of the lower lid, one in the lower fornix, one in the ocular conjunctiva below the cornea, one in the ocular conjunctiva at the nasal side of the limbus, and one in the palpebral conjunctiva near the margin of the upper lid. The growths were easily removed under cocain and adrenalin. No cauterization of the stumps was practised. The growths did not recur. One eye alone was affected. Microscopically, the growths proved to be simple papillomata. There was no evidence of malignancy.

ERNEST THOMSON.

5.—Miscellaneous.

(1) **Osborne, Alfred. — A "wrinkle" for the treatment of the trachomatous cul-de-sac.** *Bull. de la Soc. d'Ophtal. d'Egypte*, 1911, p. 14.

(2) **Rulot, H. and Duyse, M. van.—The prophylaxis of trachoma. (A propos de la prophylaxie du trachome.)** *Annales et Bulletins de la Société de Médicine de Gand*, Novembre, 1912.

(3) **Angelucci.—The influence of the seasons on conjunctivitis. (L'influenza delle stagioni sulle congiuntiviti.)** *Arch. di Ottal.*, Marzo, 1914.

(4) **Tristaino.—New observations on the distribution of trachoma in Palermo. (Nuove osservazioni sulla diffusione del tracoma in Palermo.)** *Archivio di Ottalmologia*, Aprile, 1914.

(5) **Kaz, Raphael.—The use of celluloid films in the treatment of trachoma blindness—pannus and xerophthalmos along with lagophthalmos and symblepharon. (Zelluloidfilmbehandlung bei der Trachomblindheit.—Pannus und Xerophthalmus nebst Lagophthalmus und Symblepharon.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(6) **Schimkin, N. I.—Is the terminal cicatricial form of trachoma contagious? (Ist der beendete Narbentrachom kontagiös?)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(7) **Lobassov, N. J.—Concerning the isolation of trachomatous persons. (A propos de l'isolation des trachomateux.)** *Actes de XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(1) **Osborne**, of Alexandria, has adopted a little "dodge" recommended by Groenholm for exposing the upper cul-de-sac in cases of trachoma, so as to apply remedies efficiently to its surface. As it is not generally known, it may be worth while to describe it in this place.—The curved part of Desmarres' rectractor is applied to the skin of the upper eyelid in such a way as that the convex border of the spoon looks downwards. Then, with the other hand, one pulls down the edge of the eyelid over the spoon. At the same moment one reverses the handle of the instrument behind and towards the patient's forehead, so that the eyelid is, as it were, suspended on the spoon of the Desmarres' retractor. In order to facilitate things, the patient should look downwards and throw his head a little backwards.

SYDNEY STEPHENSON.

(2) **Rulot** and **van Duyse**, of Ghent, propose the measures enumerated below in order to arrest the spread of trachoma:

(1) Information which would permit the provinces so far indemnified to be protected; (2) mitigated isolation, especially during the catarrhal stage. At the same time as this is carried out the State should relieve the patient's family; (3) the disinfection of every object which has been in contact with an eye affected with trachoma; (4) cleanliness, hygiene of the habitation, and of the person, the creation of *maisons ouvrières*, the distribution of water, lavatories, and douches.

In schools, universities, and maternities, the attention of the pupils should be directed to the dangers of the malady. School inspection should serve to trace out cases of the disease. A similar medical inspection should be carried out in mills, manufactories, works, hospitals for the incurable and insane, in disciplinary colonies, and prisons and barracks.

The authors do not recommend the measures taken in America, since they are the best of all means to propagate the disease in the neighbouring countries. An international understanding should regulate the question.

MARCEL DANIS.

(3) **Angelucci** notes that the seasonal influence on the various conjunctival inflammations seems to differ in different localities. He draws attention to Meyerhof's figures for Cairo, and compares them with those of other Egyptian observers; he concludes from these that in Egypt there are two seasonal maxima—in June and October. On the other hand, no such double maximum is noted in Italy. HAROLD GRIMSDALE.

(4) **Tristaino** gives good reason for thinking that trachoma is gradually diminishing in frequency in Palermo; he attributes this to the good work of the clinics and to the better housing and condition of the poor. The success of the anti-trachomatous clinics has inspired the poor with confidence, and of late years the number of visits paid by trachomatous patients has largely increased, although the number of individuals has diminished. This proves that the sufferers are recognising the value of an extended attendance.

HAROLD GRIMSDALE.

(5) In cases of xerophthalmos, trachomatous pannus, etc., **Kaz** inserts a thin transparent film of celluloid (0·1 to 0·03 mm. thick), in the form of a shell, covering, and in close contact with, the cornea. The result is that the surface is kept moist and becomes more transparent. Thus vision is improved. The celluloid film is well tolerated, and the results are very satisfactory. A. J. BALLANTYNE.

(6) **Schimkin,** of Odessa, applies the term "*Beendete Narbentrachom*" to cases which have suffered from trachoma, but which now show no follicles or papillary growths, no thickening of the tarsus, no irritation and no abnormal secretion, but merely more or less extensive cicatrices. Experiment

has convinced many observers that trachoma at this stage is not contagious and not communicable, and clinical experience supports this view. The author holds very strongly the view that in such cases the process is dead, and that they can be admitted to school and to the army without danger to others. He finds, however, that persons in this condition, passed by European oculists as non-contagious, have repeatedly been sent back from America as suffering from a "dangerous contagious disease," and that in spite of the fact that the U.S.A. regulations permit such cases to be accepted. The reason for this trouble lies in the fact that varying views are held as to the contagiousness of trachoma in this stage, and the results are unfair to the emigrant, to the doctor who examines him in his home country, and to the medical examiner at the port of embarkation. In the interests of all who are thus affected, the author proposes to bring before the Congress a resolution which is actually a quotation from an American writer, Schereschewsky, *viz.*, "Immigrants who show merely cicatrices indicating that they have suffered from trachoma shall be considered as cured of the disease and may be passed." A. J. BALLANTYNE.

(7) Referring to statements made in other countries to the effect that trachoma is so rife in Russia, and that the army is so contaminated that whole regiments are composed of affected soldiers, **Lobassov**, of Warsaw, gives figures dealing with his own military district, which show a steady decrease in the disease within recent years. Thus, between 1901 and 1913 the incidence of trachoma among the soldiers of the Warsaw district fell from 8 per cent. to 1·4 per cent. This reduction is the result of a campaign undertaken by the Sanitary Administration, which appointed oculists to the military districts to investigate the causes leading to such a prevalence of eye diseases, and to suggest remedies. The chief cause apparently was that the army received each year a number of new recruits suffering from trachoma. Owing to defective sanitary knowledge, they spread the disease through the army, and, at the end of the period of service, the affected men took the disease with them to the civil population. Up to the year 1906 only cicatricial trachoma with pannus or other corneal lesion was regarded as sufficient ground for exemption from military service. In 1906 a law was passed excluding all men with acute granulations or chronic conjunctivitis. This led to a great reduction in the number of eye cases entering the army, and it is hoped that it will soon be possible to dispense with this precaution, for, although it has been efficacious, it is not an ideal measure. It would be more rational to establish stricter hygienic practices among the soldiers, and to treat infected cases in an appropriate manner. Under the new conditions, in which personal cleanliness and attention to bed linen, towels, etc., is carefully supervised, Lobassov thinks that isolation is unnecessary.

In view of subsequent events, it is interesting to note the writer's concluding remark, namely, that the sanitary state of the Russian army is such that the enemy need not fear the contagion of trachoma or eye diseases in general, "but only our bullets". A. J. BALLANTYNE.

V.—MALINGERING.

(1) **Santa-Maria, Alberto.—Simulation in connection with vision and the methods of investigating it. (Simulazione in rapporto alle vista e relativi metodi d'indagine.)** *Archivio di Ottalmologia*, Vol. XIX, page 1, July, 1911.

(2) **Roche, Charles.—Unilateral exaggeration of amblyopia. (Exagération de l'amblyopie unilatérale.)** *Recueil d'Ophtalmologie*, septembre, 1911.

(3) **Andrews, Albert H.—The detection of alleged visual defects.** *Journal of Ophthalmology and Oto-Laryngology*, February, 1912.

(4) **Todd, F. C.—Malingering (pretended blindness).** *Ophthalmology*, October, 1912.

(5) **Wasjutinsky.—Eye injuries as a means of avoiding military service. (Die Verletzung der Augen als Mittel den Militärdienst zu vermeiden.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(1) In a long paper upon the subject of simulation of visual defects, often in connection with compulsory military service, **Santa-Maria** begins by discussing the subject in general and the means best calculated to detect the malingerer. In a second chapter the simulation of errors of refraction is discussed. The third chapter deals with simulation of hemeralopia, and the fourth with colour defects. The last chapter of this, the first portion of the paper, which, by the way, extends to about sixty-five pages, is occupied by simulation of defects of the visual fields of various kinds.

The great length of the paper, and the wealth of detail which it contains, speaks volumes regarding the importance of the subject in a country in which military service is compulsory, but it does not assist the making of an abstract. The papers should be studied in the original by anyone specially interested in the subject.* LESLIE BUCHANAN.

(2) **Roche,** of Marseilles, in order to circumvent the wiles of the simulator who exaggerates his defect of sight, finds it convenient to test the vision by means of a hundred cardboard squares, in each of which one of the test letters of Monoyer or Snellen types is pasted. Adopting the decimal test type, he thus has ten squares for each line of test type. The squares are all mixed up together anyhow and similarly exposed to the patient at 5 metres distance; he is asked to name those letters he can recognise and the corresponding squares are put on one side and compared with those which were said not to be recognisable. Having no means of comparing one letter with another, the simulator finds it extremely difficult to deceive the examiner and be consistent in his answers. The test may be further modified by varying the distance from the patient at which the letters are held, by putting glasses, plain or otherwise, before the eye, or by asking the patient to read the letters reflected in a mirror. By these means it generally happens that the patient's real vision can be ascertained, and the inconsistency of his answers can be very clearly demonstrated to the patient by showing him the two packets of letters as selected by himself. J. JAMESON EVANS.

(3) The most frequent object for simulating blindness is to secure the largest amount of damages as compensation after an injury. It is very unusual that total blindness is simulated, and it is easily detected by watching the person when he does not know that he is being observed. Simulation of blindness in one eye is much more frequent.

The tests may be either subjective or objective. These are summarised and explained.

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* NOTE.—The paper is continued in the August number of the *Archivio* for a further eighty pages.

Among the tests requiring special apparatus the following are enumerated :

(1) A convex glass of 6 D. is placed before the sound eye. The eye is made myopic, and the far point is about 17 cm. The book is slowly withdrawn while the patient is reading, and if it can be withdrawn beyond this far point without the patient ceasing to read, it proves that he has been reading with the eye presumed to be bad (Fuchs).

(2) A prism is held before the sound eye so that the refracting edge is horizontal and extends across the middle of the pupil, producing a monocular diplopia. The prism is then pushed on till the pupil is covered, and if there is still double vision, it is a proof that both eyes see (Albert Graefe).

(3) Cobalt glass before the sound eye. The patient to look at an incandescent light and to tell what he sees. He will be unable to analyse the light if he sees with the opposite eye, and any attempt to close this would betray him.

The Bishop-Harman test is not mentioned. HENRY L. G. LEASK.

(4) **Todd,** of Minnesota, describes a number of methods which may be employed to distinguish real from pretended blindness.—It is important, he says, to take first the objective examination of the eyes, by the ophthalmoscope, ophthalmometer, tonometer, perimeter, and by retinoscopy. The pupil and its reflexes should also be investigated. Under this heading we note the incorrect statement that if, on illuminating an eye, the direct pupil reflex is absent but the consensual reflex is present, the indication is that the eye is blind. Again, referring to the tendency of a blind eye to deviate, he says, " When perfect parallelism exists under all conditions it is good evidence of the presence of sight, and, furthermore, of sight which is nearly as good as the sight of the other eye—good enough at any rate to produce single binocular vision." These misleading statements detract from the usefulness of the paper. He goes on to describe a number of subjective tests which should be carried out after the foregoing objective tests. These include tests with prisms, lenses, and cylinders ; the use of drugs to alter the refraction ; and the employment of mirror types, coloured letters, bar reading, the stereoscope, and the amblyoscope. A. J. BALLANTYNE.

(5) According to **Wasjutinsky,** of Warsaw, self-infliction of eye injuries as a means of escaping military service is confined in Russia to certain military districts, Warsaw for example, and even there is on the decline. Usually it is the right eye that is affected, and the condition observed takes, as a rule, the form of a conjunctivitis, very often membranous, produced by the action of lime, acids, tobacco, or by the introduction of a foreign body. The cornea may be injured and show white, yellow, or brown specks. Cataract is also observed, either combined with corneal opacities, or, if the cataract is caused by subconjunctival discission, without corneal opacity. In about 50 per cent. of the cases the affection is a severe one, and in 25 per cent. blindness results. In the investigation of these cases it is necessary to make use of bacteriological and chemical methods. Where the injury has been produced by the salts of the heavy metals or by lime, it is usually possible to detect the fact by chemical tests.

The author looks to the growth of education (*Kultur*) for the extermination of the practice. Although in Russia the law against it is mild, there is a steady decrease in the number of cases, and it is now not more common than in other European countries. A. J. BALLANTYNE.

VI.—THE PUPIL.

(1) Magitot, A.—Argyll Robertson sign with spasmodic myosis on convergence (myotonic convergence). [Signe d'Argyll Robertson et myosis spasmodique à convergence (contraction myotonique.)] *Ann. d'Oculistique*, avril, 1911.

(2) Dimmer, Friedrich.—A case of tonic reaction of the pupil and ciliary muscle. (Ein Fall von tonischer Reaktion der Pupille und des Ziliarmuskels.) *Klin. Monatsbl. f. Augenheilkunde*, September, 1911.

(3) Woodroffe, John H.—The pupil and the mechanism of its reflexes in health and disease. *Dublin Journal of Medical Science*, September, 1911.

(4) Contino.—The determination of the diameter of the pupil. (Sulla determinazione del diametro della pupilla.) *La Clinica Oculistica*, November, 1911.

(5) Hesse, Robert.—The mechanism of the movements of the iris and the innervation of the musculature of the iris. (Beitrag zur Mechanik der Irisbewegung nebst Bemerkungen über die Innervation der Irismuskulatur.) *Klin. Monatsbl. f. Augenheilkunde*, February, 1912.

(6) Jarnatowski.—A case of hippus iridis and mydriasis of the left eye. (Ein Fall von Hippus iridis und Mydriasis des linken Auges.) *Centralbl. f. prak. Augenheilkunde*, February, 1912.

(7) Karplus, J. P. and Kreidl, A.—The path of the pupillary reflex. (Ueber die Pupillarreflexbahn.) *Klin. Monatsbl. f. Augenheilkunde*, May, 1912.

(8) Hesse Robert.—The contraction of the pupil in near vision. (Ueber die Verengerung der Pupille beim Nahesehen.) *Klin. Monatsbl. f. Augenheilkunde*, June, 1912.

(9) Isakowitz, J.—Remarks on Hesse's article on the contraction of the pupil in near vision. (Einige Bermerkungen zu der Arbeit von Dr. Robert Hesse " Ueber die Verengerung der Pupille beim Nahesehen.") (*See* June, 1912, *Klin. Monatsbl.*), *Klin. Monatsbl. f. Augenheilkunde*, August, 1912.

(10) Lint, van.—Paralytic myosis, pupillary reaction to adrenaline. (Myosis paralytique ; réaction pupillaire à l'adrénaline.) *La Policlinique*, 1 décembre, 1912.

(11) Uhthoff, W.—A case of periodic and persistent variations of the diameter of the pupil associated with left sided paralysis of the oculo-motor nerve. (Ueber einen Fall von periodischen und kontinuierlichen Schwankungen im Durchmesser der Pupille bei angeborener oder wenigstens frühzeitig erworbener linksseitiger Okulomotoriuslähmung bei einem neunjährigen sonst gesunden Mädchen.) *Klin. Monatsbl. f. Augenheilkunde*, September, 1913.

(1) The patient, whose case is reported by **Magitot**, of Paris, a woman, aged 57 years, had mydriasis and irregularity of the left pupil. The

reaction to light was absent in the left pupil and normal in the right. On convergence the following phenomena were observed.—The right pupil contracted and then resumed its original condition ; the left pupil contracted more slowly than the right, but continued doing so until it became punctiform, in which condition it remained for ten to fifteen seconds, after which it dilated slowly, reaching its original size in about one and a half minutes. The patient volunteered the information that on waking in the morning, her left pupil was smaller than the right, and remained so for some time. The eyes were otherwise normal, apart from some patches of anterior chorio-retinitis in the right, and they reached full vision with correction of 2.5 D. of myopia.

The author gives the note of a similar case referred to by Morax in the *Encyclopédie Française d'Ophtalmologie*, in which the Argyll Robertson pupil was bilateral, but the myosis occurred in the left eye only, and refers to other recorded cases. He discusses the situations suggested for the anatomical lesions underlying the conditions (and also the Argyll Robertson pupil phenomenon), and comes to the conclusion that, in all probability, they are located in the ciliary ganglion rather than in the mesencephalic cilio-motor centre, the roots of the dorsal nerves, the inhibitory centre in the floor of the fourth ventricle, or the iris itself.

R. J. COULTER.

(2) This phenomenon was first described by Piltz (*Neurologisches Centralblatt*, 1900) and the literature has been recently summarised by Rönne (*Klin. Monatsbl.*, Vol. XLVII, 1909.)

The following are the chief points of this case by **Dimmer,** of Vienna.—A male, aged 24 years, who, in his student days, had suffered from neurasthenia and had attempted suicide. As a school boy, he noticed that his right pupil was wider than his left, and became very small when he looked at a near object, Right pupil 8-9 mm., inactive to light by usual tests, but in dark room dilates a little, and when suddenly exposed to full light of window slowly contracts to 6.5 mm. In near vision also slowly contracts to 3 mm. It takes the eye three seconds to accommodate from infinity to 15 cm., and about the same time for the pupil to contract. Relaxation of the ciliary muscle takes 5-7 seconds. Eserine, 1 per cent., contracts the pupil to 2.5 mm.

The author discusses the various theories which have been offered to explain the 'neurotonic' and 'myotonic' reactions of the pupil. He favours the view that the lesion is central. He would discontinue the use of the terms "neurotonic" and "myotonic," and speak of such cases as examples of tonic reaction of the pupil in light reaction, orbicularis reaction, convergence reaction, etc., as the case may be.

A. J. BALLANTYNE.

(4) The determination of the size of the pupil is a problem which has been attacked in many ways, says **Contino,** none of them entirely satisfactory. In this paper, after a review of the preceding methods, he describes an apparatus which, he considers, has just claims to give an exact measurement of the normal pupil. Other apparatus has often failed, owing to a shadow being cast on the pupil while under observation.

Contino uses a horizontal microscope, the same as that which he uses to measure the depth of the anterior chamber. The tube of the microscope runs in a horizontal line by means of a rack and pinion. To the pinion is adjusted a scale by which the movements can be measured to 0·1 millimeter. The eyepiece is a special modification of Ehrlich's eyepiece for counting the corpuscles of the blood. It has a diaphragm with a square opening whose size can be altered by a small lever. Immediately in front of the diaphragm is fixed an ordinary micrometric glass scale, divided into 0·1 mm. If the tube of the microscope is 137 mm. long, each division of the micrometric scale has the value of 0.1 mm., the distance of the object from the objective to bring it to a focus is 81 mm. To prevent a shadow being thrown on the eye, Contino observes the eye through a totally reflecting prism. While the patient fixes, the tube is moved until the visual axis coincides with the axis of the tube. and then by movement of the lever the diaphragm is adjusted until the square sides become tangential to the edges of the image of the pupil. The measurements can then be read at leisure.

In the latter half of the paper, Contino gives a mathematical construction by which the real size of the pupil can be calculated from the measurement of the apparent size. HAROLD GRIMSDALE.

(5) **Hesse,** of Graz, describes a case in which Krönlein's operation was performed for the removal of a retro-bulbar tumour, the operation involving resection of the optic nerve. When the pupillary condition was investigated at intervals of three and four years after the operation, it was found that the pupil was contracted to about two millimetres, did not dilate in the dark, did not contract to light either directly or consensually, contracted with eserine, and dilated with atropine or cocaine, but best with atropine *plus* cocaine. These facts were ascertained in February, 1911. In August, 1911, the size of the pupil was 6 mm., and the shape transversely oval. There was a broad ectropion of the pigment layer. The iris stroma showed evidence of atrophy, and the lens was opaque, and the tension low.

The question of the presence or absence of a dilator muscle has been a good deal discussed, but, according to Hesse, Angelucci is now alone in disputing its existence. Münch does not deny the muscular nature of the posterior limiting membrane, but he maintains that it is too weak in itself to cause dilatation of the pupil, and that the cells of the iris stroma are muscular and are the true dilator mechanism. He also holds that in the absence of all muscular contraction, the iris, on account of its blood-vessels and the distribution of its elastic tissue, will assume the position of moderate miosis. In other words, miosis is the true position of rest At first sight, it would seem that Hesse's case, in which all pupillomotor fibres had apparently been severed, lends support to Münch's view that miosis is the condition resulting from absence of muscular action in the iris, but it is to be observed that muscular power was not absent in this case, as is shown by the possibility of altering its sizes by drugs. We are, in fact, dealing not with a flaccid paralysis, but with a spastic paralysis resulting from detachment of the iris from its central nervous connections. The miosis represents the balance of the iris musculature uninfluenced by outside nervous action. The dilation observed at a later date was the result of atrophy of the iris muscles, and therefore is the true position of rest apart from muscular influence. The case, in this view, is therefore opposed to Münch's theory. But how did the iris preserve its irritability and activity for four years after the division of its nerves? One must assume that the lowest neurone cannot have been divided. Since, however, the lowest neurones of the third nerve and sympathetic are supposed to travel to the eye by the short and long ciliary nerves, and these were probably severed in the operation, Hesse assumes the existence of intra-ocular ganglionic structures, from which the final neurones would arise. These may be identical with the ganglionic cells described by Müller (1859), Krause (1861), or Axenfeld (1907), but the matter requires further research.

A. J. BALLANTYNE.

(6) The definition of hippus which **Jarnatowski**, of Posen, follows is a rhythmic dilatation and contraction of the pupil independent of illumination,

convergence, and sensory or psychic stimuli. The case reported is that of a woman, aged 26 years, who had marked dilatation of the left pupil. Beyond a pulse rate of 90-96 and some chlorosis, nothing abnormal could be found. Both pupils re-act well both directly and consensually, but the left is always wider than the right, and does not maintain its contraction, but is in a constant state of movement. This condition has lasted one and a half years, and all treatment is of no avail. The case so far remains inexplicable.

A. H. LEVY.

(7) **Karplus** and **Kreidl,** of Vienna, criticise some results of Bumke and Trendelenburg, and claim that they have definitely proved, by experiments on cats and monkeys, that the pupillary fibres go *via* the optic tract, past the external geniculate body, to the antero-lateral aspect of the anterior corpus quadrigeminum, through the peduncle of that body. Beyond this point they have not yet been able to follow the path. A. J. BALLANTYNE.

(8) **Hesse,** of Graz, cites three cases which seem to him to prove that contraction of the pupil may accompany accommodation in the absence of an impulse of convergence. Case I. was one of wide-spread syphilitic disease of the central nervous system, with almost complete paralysis of the extrinsic muscles of the right eye; Case II. suffered from tabes, and had almost complete paralysis of the extrinsic muscles of the right eye, as well as a failure of the pupil to react to light; Case III. presented the symptoms of a typical complete paralysis of the right third nerve, but at short intervals, the ptosis disappeared, the eye turned in, and the pupil became very small. This is an example of the "Congenital cyclic affections of the oculomotor nerve" first described by Axenfield and Schürenberg, of which nine cases have already been published.

In all three cases, when the good eye was covered and a near object fixed with the other, the covered eye turned strongly *outwards* and its pupil contracted. In Cases I. and II. the pupil of the fixing eye also contracted, but in Case III. this did not occur. Assuming that, in a case of paralytic squint, the nature of the secondary deviation indicates the kind of impulse sent to the paralysed muscle, the author points out that in three cases the impulse must have been, not one of convergence, but an impulse of rotation to the left side. The pupillary contraction must therefore have been associated with accommodation in these cases. A. J. BALLANTYNE.

(9) Hesse presented an object for fixation before an eye with third nerve paralysis. The sound eye swung outwards, and at the same time its pupil contracted. Hesse saw in this a proof that accommodation alone might bring about contraction of the pupil, since we could not assume a convergence impulse in an eye which moved outwards.

Isakowitz, of Berlin, disagrees with this conclusion. His explanation is that when the paralysed eye tries to fix a near object, it receives both a convergence and an accommodation impulse. The former is not strong enough to bring about convergence, so there is added a further impulse for lateral movement. Naturally, this impulse affects also the sound eye, overcoming the convergence impulse which it had received, and causing it to turn out. An analogous phenomenon occurs when a near object of fixation is brought straight in front of one eye, under normal conditions. Both eyes receive equal accommodation and convergence impulses, but in order to keep the one eye straight, an impulse for lateral movement is added. This also equally affects both eyes, but in the one case it neutralises the tendency to convergence, causing the eye to remain straight, while in the other the two impulses are added together causing a doubly large deviation of the eye.

Isakowitz thinks that the experiments of Weiss and Wlotzka (1904) proved conclusively that accommodation alone is insufficient to bring about a contraction of the pupils. By causing the eyes to fix two points which formed parts of two transparent stereoscopic pictures, they were able to introduce a strong accommodative effort without any convergence being required. It was found that no contraction of the pupils occured. A. J. BALLANTYNE.

(10) **van Lint**, of Brussels, exhibited a patient affected with paralytic myosis. The reaction to adrenaline did not commence to manifest itself until the expiry of one hour and a quarter. MARCEL DANIS.

(11) The case reported by **Uhthoff**, of Breslau, was in an otherwise healthy child of nine years, affected with a complete and total paralysis of the left third nerve, which had dated from birth or a very short interval thereafter. The left pupil, independently of the state of the illumination, underwent continuous variations of diameter. It maintained its maximum diameter (8-9 mm.) for 8 to 12 seconds, then contracted, reaching its minimum (2-3 mm.) in 2 or 3 seconds, remained so for 6 to 8 seconds, and then gradually dilated, with slight oscillations, in the course of 10 to 15 seconds to its maximum. During the period of contraction accommodation was increased by about 1 D.

A number of details are given indicating the state of the pupil reactions to light, convergence, drugs, etc., and the case is compared with other examples of "cyclical paralysis." A nuclear lesion is supposed to be the cause of the phenomena. A. J. BALLANTYNE.

VII.—RUPTURE OF EYEBALL IN GLAUCOMA.

(1) **Lacompte.—An extraordinary case : hæmorrhagic glaucoma with rupture of the eyeball. (Un cas extraordinaire : glaucome hémorragique avec rupture du globe oculaire.)** *XVI Congrès Flamand des Sciences Naturelles et Médicales.*

(2) **Harman, N. Bishop.—Spontaneous rupture of the cornea in secondary glaucoma caused by dislocation of the lens.** *Proceedings Royal Society of Medicine : Section of Ophthalmology*, March, 1915.

(1) **Lacompte** relates the history of a case of hæmorrhagic glaucoma following arterio-sclerosis. Above the limbus was a bloody tumour, due to rupture of the sclerotic. MARCEL DANIS.

(2) An adult male was affected with congenital sub-luxation of each crystalline lens. One eye became red and painful after a fall upon the corresponding temporal region, and when seen by **Harman**, of London, some eight months after the accident, the eye was found to be in a condition of glaucoma. Some three years later, without known cause, the man attended with a rupture in the lower part of the cornea, through which the membranes protruded from the eye. Section of the eye showed that an expulsive retrochoroidal hæmorrhage was present which had driven the membranes forward, so that the last-named were stretched between the optic disc and the cornea and hung out from the rupture. Harman thinks that ulceration or degeneration of the cornea must have taken place to render the event possible. SYDNEY STEPHENSON.

VIII.—THE CURE OF SQUINT.

(1) **Rasquin.—Optical means and orthoptic exercises in the treatment of strabismus. (Les moyens optiques et les exercices orthoptiques dans le traitement du strabisme.)** *Ann. d'Oculistique*, juillet, 1913.

(2) **Harman, N. Bishop.—The cure of squint.** *Lancet*, December 12th, 1914.

(3) **Harman, N. Bishop.—The cure of squint.** *Medical Press and Circular*, December 16th, 1914.

(4) **Wootton, Herbert Wright.—The present status of squint and ocular motor imbalance.** *New York State Journal of Medicine*, February, 1915.

(1) **Rasquin**, of Namur, considers that in the treatment of squint no operation should be performed until orthoptic means have had a full trial.

He records the following case in support of his opinion.—Girl, aged 16 years. Phlyctenular ophthalmia when two years old, followed by squint, operation (tenotomy) when seven without improvement. R. eye normal, V. + 1·25 5/5. L. eye paracentral leucoma, convergent squint 35°, movements inwards 30°, outwards 35°. V. 2/50, not improved by lenses, hypermetropic astigmatism (+1·25 D. sph. +3·25 cyl., axis 135°) central scotoma. Treatment ground glass right eye, lens left eye. Three days later L.V. with correction was 5/15 and the fixation was better. Three weeks later L.V. with correction 5/7·5. Training with diploscope. Nine weeks later, fusion with diploscope at all distances. Four months later, squint gone, movements improved to 40° outwards, L. distant vision good but difficulty in reading with it. One month later, good bar reading. Two weeks later, stereoscopic training. Two weeks later, cure regarded as complete. Eyes straight, good binocular and stereoscopic vision for distance and near work. The details of the various methods employed are given at length and should be read in the original.

R. J. COULTER.

(2) **Harman**, of London, as reported in the *Lancet*, read a paper before the West London Medico-Chirurgical Society on the cure of squint. Mainly, the paper dealt with Harman's own method of subconjunctival reefing of the elongated tendon and elongating the contracted tendon by the "jigsaw" operation. Results are given of the first 100 serial cases. The results obtained after the average interval of nine months were: binocular vision 4, straight 36, error less than 3 degrees 22, less than 5 degrees 23, error 10 degrees 9, over 10 degrees 4, relapsed 1, over-correction 1. The author counts the above percentages as equivalent to 85 per cent. successes, and states that in the second 100 series the percentage of success will be still higher. One of the advantages of this combined operation is, says Harman, the power of nice regulation of effects. ERNEST THOMSON.

(3) **Harman**, of London, described briefly his operation for shortening a rectus tendon ("sub-conjunctival reefing and advancement"), and also what he termed the "jig-saw" operation for lengthening a tendon in the cure of a squint, which glasses and the training of the fusion faculty have failed to cure within a reasonable time. SYDNEY STEPHENSON.

(4) **Wootton**, of New York City, has an outspoken article dealing with the present status of concomitant strabismus and latent muscular disorders.

As to the amblyopia that so often accompanies a squint, he regards the disuse theory as far from proven, and still looks upon the amblyopia as congenital and as a primary factor in the ætiology of most cases of strabismus. His own experience of exercises with Worth's amblyoscope have not yet convinced him of their extreme utility. He does not deny that a squint progressing towards cure by means of glasses may possibly be assisted by stereoscopic exercises, but he has yet to be convinced that in such cases a cure would not have resulted from glasses alone. When he has failed to restore binocular vision by glasses or operation, he has never succeeded in securing it by means of the stereoscope.

Were it not for other factors, the advancement of both externi would seem to solve the problem of the operative treatment of convergent strabismus. But the relative degree of amblyopia and the æsthetic effect likely to follow operation must not be left out of count. A double advancement depends for its success upon faultless *technique*, and naturally this cannot always be guaranteed. There are other drawbacks to advancement of the externi, such as the prolonged after-treatment, the occasional excessive reaction, and the more or less permanent "yellow blotch" left at the site of operation. Wootton, therefore, believes that the operation should be employed in those cases only in which the sight of the squinting eye is good enough to render it probable that a serviceable degree of binocular vision will result. For example, should the squinting eye possess vision of only 20/200 as opposed to 20/20 in the "fixing" eye, it would be useless to expose the patient to the pain, inconvenience, and possible danger of a double advancement. Under such conditions, a single or double tenotomy would seem to be the proper procedure. With deeply-set eyes, advancement is exceedingly difficult, and the result is not good. The importance of binocular single vision in the ordinary affairs of life has been somewhat exaggerated. Even when no great degree of amblyopia is present in the squinting eye, it appears to Wootton that a single or double tenotomy is, all things considered, the best procedure. Advancement of both externi, as advocated by Landolt, is recommended when the squinting eye has sight of at least 20/70, when the globes are tolerably prominent, when the *technique* is perfect, and when the operation leaves no noticeable disfigurement. SYDNEY STEPHENSON.

IX.—THE CHOROID.

I.—Inflammatory Affections.

(1) **Shoemaker, W. A.—Central guttate choroiditis.** *American Journal of Ophthalmology*, March, 1912.

(2) **Chance, Burton.—A case of unusual atrophy of the choroid.** *Ophthalmic Record*, January, 1913.

(3) **Hepburn, Malcolm L.—Some cases of deep inflammatory deposits in the choroid.** *Royal London Ophthalmic Hospital Reports*, Vol. XIX, part iii, November, 1914.

(4) **Goulden, Charles.—Inflammation of the uveal tract, secondary to infection of the mucous membranes.** *Royal London Ophthalmic Hospital Reports*, Vol XIX, part iii, November, 1914.

(1) The interesting points about the three cases described by **Shoemaker**, of St. Louis, are that the patients were all seen for the first time when

they had normal fundi, that the appearances described as "central guttate choroiditis" came on in association with a reduction of vision not accounted for, as previously had been the case, by an error of refraction or accommodation, and that, in all, vision improved under mercury and iodide of potassium. In all the cases the author considered that the condition was inflammatory, not degenerative. The spots were observed to undergo a change of colour with time, from yellowish to white. In two patients the changes were bilateral, and in the third unilateral.

ERNEST THOMSON.

(2) This case, by **Chance**, of Philadelphia, showed two distinct round patches of choroidal atrophy on the temporal side, in a line with the disc, so that at first sight it looked as if there were three papillæ in the fundus of the left eye. The patches were defined by dark narrow lines, the atrophy was complete, and on the white areas, which were not ectatic, were clumps of uveal pigment arranged like karyokinetic figures. The optic disc was somewhat atrophic and cupped. The entire fundus was defective in pigment except in the region of the patches, where there was excessive pigmentation. There were no signs of disease in the right eye.

The writer regards these anomalous patches as the result of choroiditis in late fœtal or early infantile life, resulting from emboli invading the choriocapillaris in these regions. J. JAMESON EVANS.

(3) **Hepburn**, of London, gives the notes of a number of cases of deep inflammatory deposits in the choroid, and points out that all of them have certain features in common, which serve to distinguish the group to which they belong from other forms of choroiditis. These features are: (1) the sudden onset, without complete loss of vision; (2) the presence of vitreous opacities; (3) the appearance of an ill-defined area of choroidal exudation at an early stage; (4) the appearance of keratitis punctata; (5) the protracted course of the affection; (6) the nature of the choroidal scar formed at a later stage; (7) the ætiology of the cases; they are not syphilitic, but are traceable to septic infection from the lungs, teeth, intestines, or other distant parts; (8) the presence of a sector-shaped defect in the visual field, and (9) the comparatively favourable prognosis for vision. A number of points of interest are taken up and discussed in the course of the article.

R. H. ELLIOT.

(4) **Goulden**, of Oldham, bases his paper on 193 cases of inflammation of the uveal tract, occurring in 6,835 patients. He divides the diseases reviewed into the following heads: iritis, 37 cases; iridocyclitis, 142 cases; and choroiditis, 14 cases. The causes of the secondary troubles under review are thus classified: (1) oral sepsis (a) dental, and (b) tonsillar; (2) gastro-intestinal sepsis (a) gastric, and (b) intestinal (small gut and large gut), with special headings for dysentery, appendicitis, etc.; (3) respiratory sepsis (a) nose and nasal sinus trouble, (b) adenoid and middle ear trouble, (c) lung trouble (farther subdivided); (4) gonorrhœa, and (5) uterine sepsis. The author concludes that many cases of uveitis are probably due to infection from a diseased mucous membrane. The most common cause is oral sepsis. In the cases of gonorrhœa and typhoid fever he regards the connection between the eye trouble and its alleged causes as completely proved bacteriologically, whilst the indictment against the pneumococcus is, in his opinion, scarcely less strongly supported. The dangers from gonorrhœa stretch out over many years, and make the disease appear a far more serious one than it is generally credited with being. The type of uveitis which consists of a solitary patch of exudation into the choroid, with vitreous opacities and keratitis punctata, he regards as being always secondary to a source of septic

infection in some other part of the body, that source being usually a mucous membrane.

The whole case is presented in a clear, readable form, and in a critical and scientific spirit. It carries the more conviction from being destitute of faddism or partisanship, and is an article well worth careful perusal.

R. H. ELLIOT.

2.—Neoplasms.

(1) **Hegner, C. A.—Cancer metastasis in the choroid with acute iritis as the first symptom. (Karzinommetastase in der Chorioidea, beginnend mit akuter Iritis.)** *Klin. Monatsbl. f. Augenheilkunde*, July, 1911.

(2) **Reis, W.—A contribution to our knowledge of angioma of the choroid. (Zur Kenntnis des Angioma choroideæ.)** *Zeitschrift für Augenheilkunde*, October, 1911.

(3) **Lodberg, C. V.—A case of cavernous melanotic sarcoma of the choroid at the papillary margin with perforation of the retina. (Un cas de sarcome mélanique caverneux de la choroide, au bord papillaire, avec perforation de la rétine.)** *Ann. d'Oculistique*, juin, 1913.

(4) **Salus, R.—Angioma of the choroid. (Angiom der Aderhaut.)** *Zeitschrift für Augenheilkunde*, October, 1913.

(5) **Love, J. M.—Simple angioma of the choroid.** *Archives of Ophthalmology*, November, 1914.

(6) **Harman, N. Bishop.—Sarcoma of the choroid.** *Proceedings Royal Society of Medicine: Section of Ophthalmology*, March, 1915.

(1) The chief point of interest in **Hegner's** observation is indicated by the title of his paper. About three years after removal of the left mamma, on account of cancer, the patient became affected with acute iritis in the left eye, the fundus at that time being quite normal. Three weeks later, when the iritis had nearly disappeared, detachment of the retina and other changes suggestive of a new growth were found, and enucleation was performed. A flat scale-like cancerous tumour was present in the choroid. C. MARKUS.

(2) The most useful information in this paper by **Reis**, of Bonn, is that angioma of the choroid cannot be diagnosed by clinical methods, because, unless complicated by changes in the retina, it gives rise to no changes in the fundus which can be detected with the ophthalmoscope. The case described showed these secondary changes, and was diagnosed as a sarcoma of the choroid. The appearance presented by the fundus is shown by a very beautiful plate, while a second plate illustrates the histology of the condition.

T. HARRISON BUTLER.

(3) **Lodberg**, of Copenhagen, reports a case of a rounded sarcoma, 5 mm. high with a slightly constricted base, 7 mm. to 8 mm. in diameter, starting from the choroid at the lower-inner border of the optic disc. Microscopic examination showed that this was irregularly pigmented, some part of it being quite white, and contained numerous cavities of varying size separated by fairly strong barriers. The bulk of the tumour consisted of bundles of fusiform cells pressed against each other without any tendency

to the formation of connective tissue. Most of the cells had large elongated nuclei with one or two nucleoli, but some of the nuclei were ovoid and larger, while some of the cells were round. Most of the cavities were full of blood, some having fine walls and others no wall at all, so that the blood circulated in hollows in the sarcomatous tissue. The pigment was found in (1) the fusiform cells, (2) some cells with excessive ramification, which the author regards as being chromatophores of the normal choroid, and (3) large round cells of migratory character situated around the walls and in the interior vessels as well as in the interstices of the tumour.

The chief points of interest about the case are: (1) that the tumour perforated and invaded the retina instead of causing its detachment; (2) that there were free hæmorrhages on the surface of the tumour and in the vitreous during life; (3) that the tumour caused sudden diminution of vision followed by improvement; (4) the ophthalmoscopic appearance of the tumour which was slightly nodular, and of a greyish colour with reddish lines and spots (hæmorrhages and vessels) on its surface but no retinal vessels over it; and (5) the presence of some hæmorrhages in the neighbouring retina. The author has been able to find only one other case in which sarcoma of the choroid perforated the retina, and that was one very similar to his own, recorded by H. Knapp in 1868. He suggests that the peculiarities recorded in his case are diagnostic of the condition. R. J. COULTER.

(4) **Salus,** of Prague, gives a minute account of the histology of a case of choroidal angioma, and reviews the literature of the subject. The chief characteristics of these tumours are.—First, well developed cystoid degeneration of the retina in the neighbourhood of the tumour; the rest of the retina remaining normal and functional. Secondly, the detachment of the retina is confined to the region occupied by the tumour, and spreads very slowly; from the nature of the growth the exact opposite would be anticipated. Thirdly, the appearance of adhesions between the outer layers of the retina and the deeper layers, without any sign of inflammatory reaction. Fourthly, the appearance of a dense membrane of connective tissue or epithelial cells, which separates the tumour from the interior of the eye. T. HARRISON BUTLER.

(5) **Love,** of Massachusetts, gives clinical and pathological details of a case of simple angioma of the choroid, together with a *résumé* of the literature of the subject. He sums up his conclusions as follows.—This case is similar to those previously described, and illustrates the practically uniform features of angiomata of the choroid. These tumours usually begin in the region of the macula; they are not cavernous, but simple in type, like congenital nævi of the skin; and they are probably due to some congenital disturbance in the innervation of the vessels supplying the affected region.

R. H. ELLIOT.

X.—OPERATIONS.

21.—Enucleation.

(1) **Gradle, Harry S.—Concerning removal of the eyeball. Exenteration versus enucleation.** *Archives of Ophthalmology*, Vol. XLIV, No. 1, January, 1915.

(2) **Veasey, Clarence A.—Purulent meningitis, following penetration of an eyeball by a fishhook.** *Archives of Ophthalmology*, Vol. XLIV, No. 1, January, 1915.

(1) **Gradle**, of Chicago, has studied the statistics of a series of cases of removal of the eyeball, and has divided his paper into three sections, the first of which, now published, is devoted to "The question as to whether enucleation is preferable to exenteration, or *vice versâ*, and in which case each operation is preferable." The advantages and disadvantages of the two operations are discussed in a lucid and interesting manner. The patient is thought to be safe from sympathetic ophthalmia four weeks after an enucleation. We are reminded, and not unnecessarily so, that *not* every irido-cyclitis developing in a sound eye, after an injury to its fellow, can be classed as "sympathetic"; syphilis and other causative factors must be excluded. Stress is laid on the danger of sympathetic ophthalmia, which is incurred by leaving uveal remnants behind, since these provide a source for the manufacture of antigens, whereby the whole system becomes sensitised. "Enucleation, if performed in time," is said to be "a positive prevention of sympathetic trouble." "The question as to whether enucleation of a panophthalmitic eye is liable to result in meningitis," is next taken up, and the author decides to sit on the fence, as the following sentence shows:—"it is not justifiable to assume that enucleating an eye suffering from panophthalmitis is dangerous to the life of the patient, in that a fatal meningitis will result. But lacking positive evidence to the contrary, it is advisable to eviscerate the eyeball in the presence of an intensely purulent panophthalmitis." With the latter half, at least, of this opinion, many will agree. The paper is well worth perusal.

R. H. ELLIOT.

(2) **Veasey,** of Spokane, publishes the case of an elderly man who was wounded in the eye by a fishhook, and was obliged to travel a considerable distance, before he could get it extracted; the patient at first refused enucleation, though it was urged on him owing to the onset of intra-ocular suppuration. Eventually, the eye was enucleated about 57 hours after the first infliction of the injury. Eighty hours after the accident, signs of purulent meningitis showed themselves, and death occurred three days later.

The previous records of cases of the same kind are discussed, and the various opinions which have been put forward are considered. Veasey leans to the view that the meningitis is not caused by the operation, but rather that the meningeal infection precedes the operation, and that the symptoms manifest themselves after the operation has been performed. This view is in accordance with Marshall's opinions, which he quotes at some length. The reviewer would only make the one comment (he has, unfortunately, seen two cases of the kind in question), that the suddenness with which the meningeal symptoms follow the operation would seem to indicate that if operation is not the *causa causans* of the meningitis, it at least appears to hurry on the manifestations of the condition. With Veasey's conclusion that, given a case of infected eyeball in which enucleation must be performed, the earlier it is done the better, everyone will be in agreement.

R. H. ELLIOT.

22.—Cataract.

(1) **Harbridge, D. Forest.—Senile cataract extraction followed by certain complications.** *Annals of Ophthalmology*, January, 1914.

(2) **Knapp, Arnold.—Report of one hundred successive extractions of cataract in the capsule after subluxation with the capsule forceps.** *Archives of Ophthalmology*, Vol. XLIV, No. 1 January, 1915.

(3) **Fisher, W. A.—Loss of vitreous in the intracapsular cataract operation and its prevention.** *Archives of Ophthalmology*, Vol. XLIV, No. 1, January, 1915.

(1) **Harbridge,** of Phœnix, has selected from his work at the Chester Hospital eight cases in which cataract extraction was performed on patients 80 years of age or above. "Out of the entire series only two can be considered successful in their ultimate results," and even in the two successful ones the report is qualified by the writer, who feels that in these old patients the indication is to avoid being too aggressive. He also favours dividing the operation into two stages, by doing a preliminary iridectomy, in order to gain information as to how the patient will stand the operation. The experience here recorded will probably be considered by most surgeons as exceptionally unfortunate. The reviewer has operated on many patients over 80 years of age, and on one well over 90, and whilst admitting that to undertake any operation in old patients is an anxious responsibility, his results have not been such as to discourage him in undertaking such procedures as cataract extraction. Indeed, the old lady of about 94 years was active enough in mind and body to get out of bed and steal a necklace from under a neighbour's pillow the very first day her eyes were released. Nor can the reviewer agree that, once one decides that an extraction should be attempted, it is sound practice to divide it into two stages. His experience has been that a patient may come through one operation apparently unscathed, and yet break down mentally under the strain of a second one, especially if it comes close on the heels of the first. R. H. ELLIOT.

(2) **Knapp,** of New York, found that when employing Smith's method of intracapsular extraction of cataract, it was necessary to subject the eye under operation to greater pressure than seemed wise, and he therefore returned to the capsule laceration method, until the advantages of Kalt's forceps were brought under his notice. He now uses this instrument to subluxate the cataract, or failing that, to remove a very large piece of capsule, and the removal of the cataract is then proceeded with. Details of the cases are given. Knapp is in favour of the intracapsular operation, provided that the attendant risks can be reduced to moderate dimensions, and he thinks the use of Kalt's forceps in the way he advocates is a step in this direction. The work of Stanculeanu and others is mentioned. R. H. ELLIOT.

(3) **Fisher,** of Chicago, discusses the causes of loss of vitreous which occur during cataract extraction, and figures three instruments of his own invention, whereby he proposes to lessen the danger in question. One of these is a lid elevator and double hook, both in one handle, another is a needle and Smith spoon, likewise combined; and the third is a capsule forceps. The objects and method of use of these various instruments are given in some detail. The paper closes with a tabulation of what, in the writer's opinion, are the advantages and disadvantages of the intracapsular operation. It is an interesting and readable communication. One criticism may be allowed, *viz.*: that it is most undesirable, from the point of view of aseptic surgery, to have two instruments mounted on one handle, and to use each in turn, as the author apparently does. R. H. ELLIOT.

23.—Decompression.

(1) **Pólya, Eugen.—The surgical treatment of choked disc. (Die chirurgische Behandlung der Stauungspapille.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(2) **Bednarski, A.—On decompression operations in diseases of the optic nerves.** *Archives of Ophthalmology*, Vol. XLIV, No. 1, January, 1915.

(1) **Pólya,** of Budapest, advises operation in every case of choked disc, when once pseudopapillitis, nephritis, syphilis, etc., have been excluded, and it should be done before vision has been seriously impaired. Decompressive trephining is dangerous only in advanced cases. On the other hand, decompressive trephining, done early, often seems to lead to cure, not only of the eye condition, but of the other symptoms as well.

A. J. BALLANTYNE.

(2) **Bednarski,** of Lemberg, gives notes of the cases of six children in his *clinique*, for whom decompression operations were performed. In five of these a callosal puncture was made, in one a trephining was added, and in another a number of lumbar punctures were made. The cases illustrate four diseased conditions, which call for decompression operations, *viz.*, acquired and congenital hydrocephalus, oxycephalus, and tumour of the brain. Those interested in the subject must read the paper in the original.

R. H. ELLIOT.

24.—Orbitotomy.

(1) **Rollet.—The ablation of orbital tumours and sub-aponeurotic exploratory orbitotomy. (L'ablation des tumeurs de l'orbite et l'orbitotomie exploratrice sous-aponévrotique.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(1) **Rollet,** of Lyons, claims that his operation of sub-aponeurotic orbitotomy allows deep exploration of the orbit and often removal of orbital tumours, without injury to bone, nerves, blood-vessels, and orbital fat, with complete conservation of the integrity of the eye, and with an invisible cutaneous cicatrix.

After uniting the lids by stitches to protect the eye, a curved incision, not less than 3 cm. long, is made down to the bone at the outer margin of the orbit. The aponeurosis is separated from the orbital edge, and this opening admits to a space in which the finger can explore without injury to any orbital structure. It is bounded, on the one hand, by the orbital periosteum, and, on the other, by an aponeurosis which encloses the orbital fat, etc. In many cases the tumour is situated in this space. A. J. BALLANTYNE.

25.—Trephining.

(1) **Coppez, H.—Trephining of the sclero-corneal limbus for staphylomatous leucoma adherens. (Trépanation du limbe scléro-cornéen pour leucome adhérent staphylomateux.)** *Société Belge d'Ophtalmologie*, 28 avril, 1912.

(2) **Elliot, R. H.—The operation of sclero-corneal trephining considered in relation to the principles which should guide us in the performance of a sclerectomy.** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(3) **Callan, Peter A.—Glaucoma from the operative standpoint.** *New York State Journal of Medicine*, December, 1914.

(1) **H. Coppez**, of Brussels, recommends Elliot's operation under these circumstances.

MARCEL DANIS.

(2) This paper by **Lt.-Colonel Elliot**, of London, for the most part covers familiar ground. He indicates that he has now definitely adopted the practice of using the two millimetre trephine, cutting more deeply towards the corneal edge so as to obtain a disc hinged by its scleral edge, and removing more or less of the disc with the scissors according to the amount of permanent effect desired.

As regards late infections, of which he has found records of fourteen cases, he suggests two causes, namely, either a leaking fistulette along the line of the conjunctival incision, or too thin a flap with a highly vesicular scar liable to injury. The former fault can be cured by touching the leaking point with 2 per cent. silver nitrate on a probe. In the other case the patient should be warned to seek advice if the slightest signs of irritation arise.

A. J. BALLANTYNE.

(3) **Callan**, of New York City, says that in the inflammatory forms of glaucoma twenty-four to thirty-six hours may be profitably employed prior to operation by applying leeches to the temple and by using the following drops to the eye every hour:—Eserin. salicy., 1 per cent.; pilocarpin muriat., 2 per cent.; solution of dionin, 10 per cent. By pushing the drops subsequent operation is facilitated. Speaking of the diagnosis of non-inflammatory glaucoma the author states that early in the disease the nerve-head may be swollen instead of excavated. He traces briefly the history of the various operations devised for the relief or cure of glaucoma since the paracentesis advocated by Querin in 1769. He has a good word to say about trephining, but seems convinced that trephining is not indicated in cases of acute glaucoma, where iridectomy yields excellent results.

SYDNEY STEPHENSON.

26.—Keratoconus.

(1) **Wray, Charles.—Cases of keratoconus (conical cornea).** *Proceedings Royal Society of Medicine: Section of Ophthalmology*, Vol. VII, July, 1914.

(1) The three cases of keratoconus reported by **Wray**, of London, are of a very striking character in regard to the brilliance of the results of cauterisation.

The first case is that of a female, whose age is not stated. She came under Wray's care some years ago. As a result of passing through a period of intense anxiety, her astigmatism had increased from + 7 D. in each eye to + 18 in the right and + 16 in the left eye. As the result of two cauterisations of the left eye and five of the right, the corrected vision has improved from R. 3/60?, L. 6/12, to R. 6/9 and L. 6/6 partly. The amount of the astigmatism is now (May, 1914, a year after the last cauterisation) — 3·5 in each eye.

In the second case, a female, aged 34 years, the astigmatism was reduced from + 9 and + 13 to — 3·5 and + 8 in the R. and L. eye respectively.

In the third case the original astigmatism is not stated. The patient was a female, aged 67, who had not been able to thread a needle since she was 16 years old. As the result of four operations on the right eye and five on the left, the astigmatism is now (May, 1914) R. — 2, L. — 3·25 and the visual acuity respectively 6/24?, and 6/18. ERNEST THOMSON.

27.—Ptosis.

(1) Marquez, M.—Technical details of Motais's operation for ptosis, with original modifications. (Tecnica detallada de la operacion de Motais con modificaciones originales.) *Archivos de Oftalmologia Hispano-Americanos*, Enero, 1915.

(2) Marquez, M.—Ptosis of the upper eyelid cured by Motais's operation. (Ptosis de la paupière supérieure guéri par l'opération de Motais.) *Archives d'Ophtalmologie*, mai-juin, 1915.

(1) The details of the operation practised by **Marquez**, of Madrid, are as follow.—The upper lid is everted and drawn up by means of a small sharp hook fixed in the lid near the free margin. The eye is drawn down by a second hook in the upper part of the sclero-corneal junction; and by these means the superior fornix of the conjunctiva is obliterated. An incision is made horizontally about 7 mm. or 8 mm. from the cornea over the insertion of the superior rectus and a second vertically backwards from the first to the upper border of the tarsal "cartilage"; here a third incision is made horizontally along the border of the cartilage. The conjunctiva is then dissected back, and the underlying capsule of Tenon divided. A squint hook is then passed from without inwards under the tendon and slipped up and down for a distance of about a centimeter, so as to separate it entirely from the globe. Marquez, then, by the aid of a sharp-pointed hook, separates the inner from the outer half of the tendon and passes the sutures which will be used to fix the flap in position before he divides the flap from the sclerotic. He then cuts with scissors through the fascia above the tarsal plate and dissects down through the soft tissues between the plate and the skin almost to the free margin of the eyelid. The sutures are then passed down in this space and tied on the skin surface. HAROLD GRIMSDALE.

(2) **Marquez,** of Madrid, publishes a case of ptosis cured by the Motais operation, the first reported from Spain. He details the method of operation he adopted in this case, and they are in accord with those given in the last abstract. Instead of detaching the central portion of the tendon, as in Motais's original method, however, Marquez detaches one-half of the tendon for insertion into the upper eyelid. This modification simplifies the *technique* of the operation considerably, and was first employed by the present reviewer in a small child (see *Trans. Ophthalmological Society U.K.*, Vol. XXIX, 1909, p. 6). No diplopia followed the operation in Marquez's patient. When

examined with the Maddox rods, orthophoria was found to be present, which proves that the portion of the tendon whose insertion was not interfered with was adequate to secure the normal functions of the muscle in question.

SYDNEY STEPHENSON.

28.—Ectropion.

Rodolfo del Castillo Ruiz.—An operation for ectropion of the lower lid. (Procedimiento operatorio del ectropion del parpado inferior.) *Archivos de Oftalmologia Hispano-Americanos*, Enero, 1915.

This method is useful only in non-cicatricial cases. It consists in the excision of a fold of conjunctiva; the margins of the resulting wound are then brought together with sutures. HAROLD GRIMSDALE.

XI.—REMEDIES.

(*Seventh Notice*).

(1) **Grandclément.**—The importance of massage of the lacrymal sac in the case of diseases of the lacrymal passages. (Importance du massage du sac lacrymal pour la guérison des voies lacrymales.) *La Clinique Ophthalmologique*, 10 juillet, 1914.

(2) **Puscariu, Elena.**—The treatment of trachoma. (Traitement du trachome.) *La Clinique Ophtalmologique*, 10 août, 1914.

(3) **Darier, A.**—Dionine in glaucoma (hypertension). [La dionine dans le glaucome (hypertension).] *La Clinique Ophtalmologique*, 10 septembre, 1914.

(4) **Kirkpatrick, H., Major I.M.S.**—The use of hexamethylene-tetramine in septic inflammations of the cornea and conjunctiva. *Indian Medical Gazette*, June, 1915.

(1) **Grandclément**, of Lyons, emphasizes the necessity, not only of frequent emptying of the sac, but of instructing the patient how to press upon the sac, so as to empty it. Grandclément believes in (1) gentle probing; (2) lavage; (3) massage of the sac by the patient ten, twenty, or thirty times a day. If, at the beginning of treatment, the probe cannot be passed, a few days of massage will so improve the condition that in many cases the probe can then be passed. Massage acts in two ways.—It tends to restore the elasticity of the sac, while the repeated rubbing of the walls of the sac against each other mechanically cures the inflammation and dries up (*tarit*) the mucus or muco-pus, which, by its glue-like character, hinders the onward movement of the tears. "Teach the patient to do as I have indicated," says Grandclément, "and you will obtain astonishing results." ERNEST THOMSON.

(2) **Puscariu**, of Bucharest, gives a summary, with illustrations of the operative methods, of the treatment of trachoma as she carries it out.

She relates the medicinal method in acute cases, by the application of nitrate of silver; the surgical method of *brossage* in the stage immediately following, and in the early chronic stage; the method of *curettage* when matters have progressed a step further; and, finally, when the granulations in the culs-de-sac have been got rid of, and the disease is localised in the tarsal region and operation becomes necessary on a thick and incurved tarsus, Puscariu employs the Heisrath excision of the tarsus and conjunctiva. In the case where the conjunctiva over the tarsus is free of granulations, but the tarsus is itself badly affected, she performs excision of the tarsus alone by the Kuhnt procedure. Where pannus requires separate treatment, Puscariu employs cauterisation of the large vessels two to three millimetres outside of the limbus, scarifications of the actual pannus, or subconjunctival injections of cyanide of mercury. In the last case two to three drops of a 1/1500 or 1/2000 solution, with one drop of 1 per cent. acoine, are injected near the cornea. In children up to 16 years the treatment should be conservative. Brossage and curettage are here the only surgical methods to be employed.

In complete entropion of the upper lid, Panas' operation is the one to employ. For the lower lid cauterisation down to the tarsus. For partial entropion of either lid the author uses the method of Spencer Watson, which consists in the making of zig-zag incisions at the outer end of the lid, dissecting up the flaps, and then transposing these flaps, so that the one which contains the lashes is placed higher than the other which does not.

ERNEST THOMSON.

(3) **Darier**, of Paris, finds fault with Thienpont, because the latter has stated that since dionine may raise the tension of the eye, it is contraindicated in glaucoma. Darier says that in a case of hypertension, eserine should be instilled before any other drug; the useful analgesic effect of dionine can then be obtained without the risk of elevation of tension. ERNEST THOMSON.

(4) **Major Kirkpatrick**, of Madras, has treated several cases of hypopyon keratitis with urotropin (hexamethylene-tetramine) given in doses of fifteen grains thrice daily, and is quite sure that the drug has hastened the cure of the disease. Its use has been combined with atropin locally. Paracentesis, in addition, has been required in some cases. Major Miller, the chemical analyst, of Madras, found the drug in the tears of a patient with a septic ulcer of the cornea who was under urotropin treatment.

The treatment was first tried in a case of acute infection following cataract extraction. The corneal wound was much infiltrated, the anterior chamber was half full of pus, and the pupil blocked by exudate. Fifteen grains of urotropin were given every four hours, cyanide of mercury was injected under the conjunctiva, and atropin and conjunctival irrigations were used. The case cleared up in a very striking manner, and in four weeks' time, the eye had vision 6/36 when corrected.

A case of gonorrhœal ophthalmia in an adult is also related, in which the administration of urotropin three times a day was combined with the "usual treatment." There was very rapid improvement. H. HERBERT.

BOOK NOTICE.

Transactions of the American Academy of Ophthalmology and Oto-Laryngology, 1915. Published by the Academy.

This volume of 384 pages represents the work accomplished at the nineteenth annual meeting of the American Academy of Ophthalmology and Oto-Laryngology held at Boston, Mass. in October, 1914. To ophthalmology are devoted 281 pages; to oto-laryngology 88 pages; and to a description of instruments appertaining to both specialities 6 pages. An unpretentious index occupies a couple of pages. This clearly printed volume is well-edited, although we came across one disconcerting blunder, namely, the discussion on a paper on trachoma bodies by F. W. Alter and W. O. Bonser is split asunder, one portion being found, where it should be, on page 226, and the other forty pages further on in the book, where it assuredly should not be.

Abstracts of the more important contents of the *Transactions* will be published in due course in the columns of THE OPHTHALMOSCOPE. E.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

THE TREATMENT OF CATARACT IN INDIA—A CORRECTION.

To the Editor of THE OPHTHALMOSCOPE.

Sir,—In my article on the " The Progress in the Treatment of Cataract in India," published in the June number of THE OPHTHALMOSCOPE, will you kindly correct the figures in the Bengal column, 1912. Instead of 2,464, it should be 5,679 and in 1913, instead of 1,291, it should be 5,891.

Yours truly,
HENRY SMITH, LT.-COL. I.M.S.

AMRITSUR, PUNJAB,
June 23rd, 1915.

[The figures were printed as given in the original MS.—*Editor.*]

NOTES AND ECHOES.

Deaths.

DEEP sympathy will be extended to our Canadian colleague, Dr. G. Sterling Ryerson, in the bereavement that has befallen him. His son was killed in the battle of Langemarck. His wife and daughter were on the " Lusitania " when the liner was torpedoed and sunk off the Irish coast. The daughter was saved, but Mrs. Ryerson was drowned. Dr. Ryerson was at the time of that dreadful occurrence in England in the interests of the Red Cross work.

The death is announced of A. Birnbacher, professor of ophthalmology in the University of Graz.

F. Löffler, well-known in connection with the Klebs-Löffler bacillus, died in April last at the age of 63 years.

The death is announced of Dr. Haltenhoff, of Bern, aged 73 years.

The death is announced of Mark D. Stevenson, of Akron, Ohio, a widely-known ophthalmic surgeon of America's middle West.

* * * *

Appointments.

DR. EDWARD ROBERTS, consulting surgeon to the Royal Eye Hospital, Manchester, has been elected President of the Aberystwyth Infirmary.

Dr. A. J. Ballantyne has been appointed consulting ophthalmic surgeon to the Glasgow Royal Maternity and Women's Hospital.

Dr. Henry L. G. Leask has been appointed honorary surgeon to the Glasgow Eye Infirmary, *vice* James Hinshelwood, resigned.

A. Lewis McMillan has been elected consultant eye specialist to the Glasgow Corporation Hospitals.

Mr. Geo. H. Oliver has been appointed honorary surgeon to the Ophthalmic Department of the Royal Eye and Ear Hospital, Bradford.

* * * *

Montgomery Lectureship in Ophthalmology.

THE Board of Trinity College, Dublin, has appointed Miss Euphan Montgomerie Maxwell to the recently-established Montgomery lectureship in ophthalmology. The lady is a Fellow of the Royal College of Surgeons in Ireland, and already holds the position of assistant surgeon and pathologist at the Royal Victoria Eye and Ear Hospital, Dublin.

* * * *

Mr. W. A. Brailey's Will.

MR. WILLIAM ARTHUR BRAILEY, aged sixty-nine years, honorary Fellow of Downing College, Cambridge, and consulting ophthalmic surgeon to Guy's Hospital, London, left estate of the gross value of £10,003.

* * * *

The Oxford Ophthalmological Congress, 1915.

IT speaks volumes for the enterprise of this Congress that the annual meeting was held on July 15th and 16th last at Keble College, Oxford, much as though Europe were not plunged into a calamitous and wicked war. *Mais la science n'a pas des frontières.* The feature this year was the discussion on "Industrial diseases and accidents," ably opened by Dr. Frank Shufflebotham, of Newcastle-under-Lyme. Among the numerous communications on miners' nystagmus, industrial cataract, plumbism as it affects the eye, and siderosis, special mention should be made of one contributed by Dr. Edgar L. Collis, of the Home Office, on "Eye injuries caused by occupation: their prevention and first-aid treatment." The discussion on these various subjects was maintained with great vivacity by the members. The presence of Dr. T. M. Legge, of the Home Office, added much interest to the debate, and elicited many interesting facts from his unrivalled experience of industrial conditions.

Sir St. Clair Thomson, of London, gave an interesting lantern address on the surgical anatomy of the nose, and the accessory sinuses, in relation to the eye and orbit. Sir Mackenzie Davidson, also of London, demonstrated the use of the telephone detector for foreign metallic bodies in and about the eye, more especially in the orbit. Mr. W. H. H. Jessop had an opportune paper dealing with the question of papillœdema following injuries of the vault of the skull in the present war. Mr. Stephen Mayou delivered an address on "Mooren's ulcer of the cornea," and showed excellent pathological specimens of the disease upon the screen. Lieut.-Col. R. H. Elliot gave an address upon the operation of couching, as practised in India, and demonstrated a remarkable series of eyes lost as the result of that ancient procedure. The discussion went to show that in a small class of case there was still a place for "couching," practised under modern aseptic conditions. Mr. T. Harrison Butler's paper on "The tragedy of sclerostomy," which elicited much discussion, is printed in the present issue of THE OPHTHALMOSCOPE.

In the scientific museum there were exhibits by Sydney Stephenson and R. H. Elliot, F. W. Edridge-Green, J. Burdon-Cooper, Percival J. Hay, R. J. Coulter, W. H. H. Jessop, Philip H. Adams, N. C. Ridley, John Gray Clegg, C. J. Russ Wood, S. E. Whitnall, J. H. Sutcliffe, Robert Fagin, of Memphis (*in absentiâ*).

At the Eye Hospital cases were shown and operations demonstrated by Mr. Philip H. Adams, Dr. William Robinson, Mr. N. C. Ridley, Mr. E. H. E. Stack, and Mr Bernard Cridland, the honorary secretary of the Congress.

A word should be added about the social side of the Congress, which, as usual, was well maintained. Mr. Robert W. Doyne, the past Master of the Congress and its founder, presided at the dinner of the Congress, which was held on the 15th of July in the Hall of Keble College. On the 16th there was to be a garden party in the gardens of Exeter College, but since the elements were unkind, the members of the Congress were received by the Rector of Exeter and Mrs. Farnell in the College Hall. The Rector was good enough to explain the various points of interest, not only of the Hall, but of the College Chapel as well. That evening there was a smoking concert in the junior common room at Keble College.

For the first time in the history of the Congress, to the regret of everybody, not a single American citizen was present. Foreigners, too, were conspicuous by their absence. What the meeting lacked in numbers was, however, more than compensated by the enthusiasm of the members.

* * * *

Our American Cousins.

A COUPLE of ophthalmic surgeons, Dr. Allen Greenwood, and Dr. Alexander Quackenboss, both of Boston, were among the thirty-two *alumni* of Harvard University who have recently reached these shores with an ambulance for service in Flanders (or elsewhere). Drs. Charles Maghy and Sidney Walker, of Chicago, have sailed for England with the Chicago unit, which has elected to serve in a British Field Hospital.

* * * *

Anæsthesia.

THE following criticism of M. H. Whiting's advocacy of chloroform anæsthesia as opposed to ether anæsthesia (*British Medical Journal*, November 21st, 1914) appears in an editorial in the *American Journal of Ophthalmology* for February, 1915.

"It is surprising how tenaciously most English surgeons adhere to the use of chloroform when it has been so definitely settled that it is unsafe as compared to ether. With the exception of the danger of explosion when using a cautery, the objections raised by Whiting are without weight. All can be and are obviated in the hands of a skilled anæsthetist. Most of us in America feel much safer with or under ether."

* * * *

The Wool Test for Colour Vision.

THE Board of Trade, after somewhat unaccountable delays, has at last decided to discontinue the wool test. On and after January 1st next, it will no longer be employed in the sight tests.

* * * *

Diploma in Ophthalmology: University of Oxford.

THE following gentlemen satisfied the examiners at the examination for the D.O.(Oxford), concluded on July 24th last: Herbert Alfred Bodkin and Jehangir Manekji Talati.

THE OPHTHALMOSCOPE DIARY.

1915.

American Academy of Ophthalmology and Oto-Laryngology	Oct. 5th to 7th	Chicago, Ill.

THE

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ORIGINAL COMMUNICATION.

A RÉSUMÉ OF THE SIX CASES OF BLASTOMYCETIC INFECTION OF EYELIDS REPORTED IN MEMPHIS.*

BY

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Introduction.

In every blastomycetic infection should be found a distinct budding organism—the blastomycete—which, if transferred to a culture tube, will produce a yeast-like fungus growth. If an animal is inoculated from the pus of a blastomycetic lesion, a similar lesion will be produced at the site of inoculation; or a general infection may follow, thus producing systemic blastomycosis.

This yeast-like fungus usually attacks the skin, yet lesions of the lungs, liver, kidney, bone, etc., have been described. Mucous membranes seem to be immune; especially the mucous membrane of the eye, the conjunctiva. In the most severe eye lesions we have observed, where all the skin around the eye had been destroyed, the conjunctiva showed no signs of attack. It suffered only from exposure. Twenty-five per cent. of all the skin lesions are

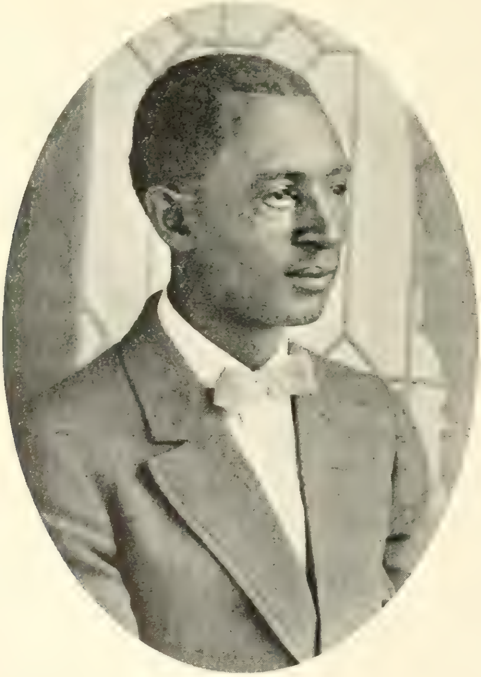

Fig. 1.

Dr. Simpson's case.—Arthur Thompson.

Picture made April 15th, 1915, shows patient as cured.

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[*] Thesis for the degree of Doctor of Ophthalmology, University of Colorado, U.S.A., 1915.

found to begin in the region of the eyelids; perhaps the outer or inner canthus. One authority explains this fact by saying that it is such a common habit to rub or scratch the eyelids, especially where there is wind or dust. An abrasion is thus produced, and the infection gains entrance. Once established, the infection gradually spreads to the surrounding skin.

The attention of the medical profession was first called to this disease in 1894 by T. C. Gilchrist. He met with it in the form of a peculiar skin lesion on the back of a man's hand, and, after studying it pathologically, named it "Blastomycetic dermatitis." Since then, many cases have been studied and worked out pathologically. In fact, thirty-five cases, external and internal, were recorded in literature during the first ten years following the discovery of its cause.

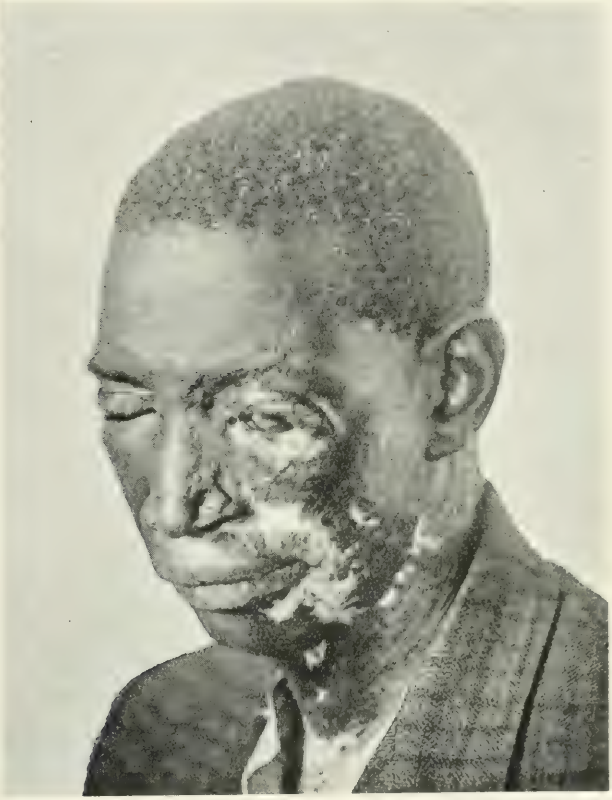

FIG. 2.

Dr. Haase's patient.—L. P. Picture No. 1. showing eye first attacked and result of healed lesions.

The first lesion is usually a papule, speedily changed to a pustule, and, then, followed by peripheral extension of the same lesion. The growth soon presents itself as irregular elevations between which pus oozes—especially under pressure. It usually heals at the centre, while it extends at the periphery. The tumour-like mass is found to be composed of miliary abscesses, in which the finding of budding organisms makes a positive diagnosis. Clinically, the skin lesions around the eye may resemble an epithelioma, especially an infected one; a carcinoma; or the skin lesions of syphilis or tuberculosis. Finding the organism, I repeat, clears up the diagnosis. The histological findings alone will not suffice.

History of the Memphis Cases.

Dr. Simpson, one of my partners, had the opportunity of seeing several eye lesions of blastomycetic origin during his service at the Illinois Charitable Eye and Ear Infirmary and at the Cook County Hospital. When he entered private practice, he was naturally on the alert for the disease, so the first case reported in Memphis was in a private patient of his, brought to him by Dr. J. A. Porter, of Ripley, Tennessee. Dr. Marcus Haase saw this patient with Dr. Simpson. Dr. Haase grew cultures and demonstrated the organism, thus making a positive diagnosis of blastomycetic dermatitis of the eyelid. I am, also, indebted to Dr. Haase for working up my case pathologically, and to his private laboratory for growing the cultures, etc. Four of the Memphis cases came direct to Dr. Haase, and, with his permission, I report them. I saw three of these cases with him. They all showed the typical lesions. With the permission of Dr. Simpson, I report his case.

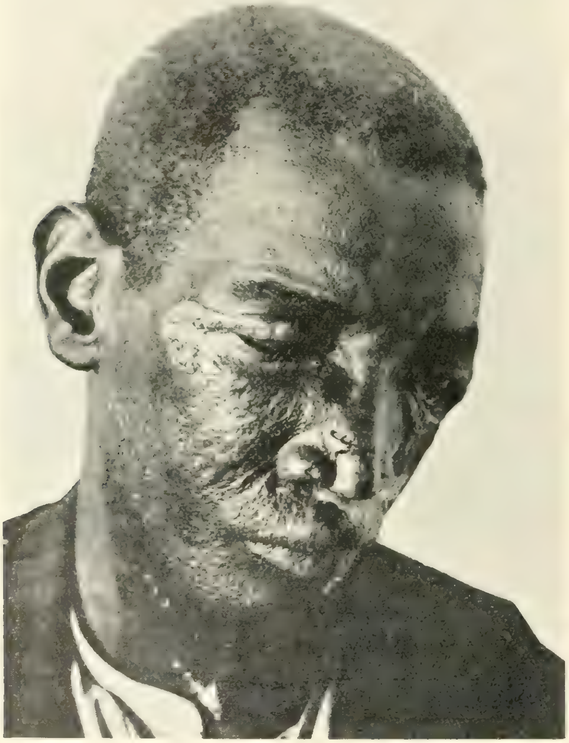

FIG. 3.

Dr. Haase's patient.—L. P. Picture No. 2. showing right eye. Lesion on left side entirely healed.

History of Case.

Arthur Thompson, coloured, aged 18 years, from Ripley, Tennessee. During the summer, 1905, patient noticed a small growth on lower lid of right eye. This growth gradually extended, and patient was brought to Memphis by his family physician in August, 1906. On Dr. Simpson's history card was written the following:—"Peculiar warty growth involving the entire external surface of lower lid of right eye. The lower border of the growth is very much elevated. The surface is thinly covered by a crust, and, on pressure, yellowish pus exudes from the growth, especially from the lower border. The skin is destroyed clear to the margin of the lid, but the conjunctiva is not affected. No history of syphilis or tuberculosis.

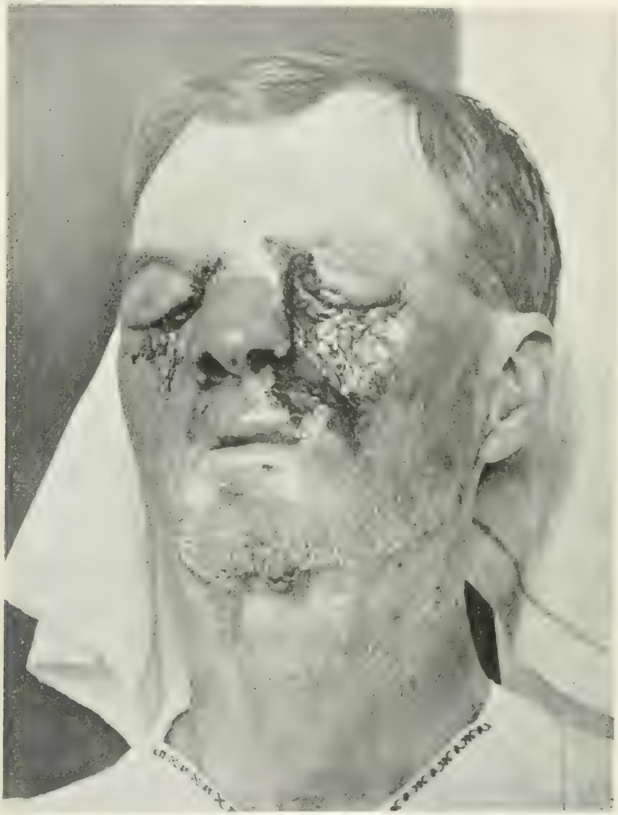

FIG. 4.

Dr. Haase's patient (this is the only white patient reported from Memphis).—W. F. N. Picture made April, 1914.

A specimen of the growth was removed and sent to Dr. Haase for diagnostic purposes. Some of the pus was also examined by Dr. Haase. He demonstrated the organism, grew cultures, and thus proved, beyond a doubt, that Dr. Simpson's clinical diagnosis of "Blastomycetic dermatitis" was correct.

The patient was given large doses of potassium iodide, and X-ray treatment was also applied. The growth entirely disappeared, but left rather a marked ectropion, which was corrected by Dr. Simpson a few months later with a skin graft from the arm. The photograph (Fig. 1), made on April 15th, 1915, shows patient as he is to-day. Dr. Simpson brought this case under the notice of the Memphis and Shelby County Medical Society in 1906. It is, therefore, the first case of this interesting lid disease ever reported in Memphis.

With the permission of Dr. Haase, I report his four cases, as follows :

History of Cases.

L. P., aged 29 years, seen first in February, 1908. The mischief began eight years previously, on the outer canthus of the left eye, and, when Dr. Haase saw the patient, the whole left side of his face, as well as the upper and lower lid, had been involved, leaving a smooth glazed scar, as shown in Figure 2. It recently crossed the upper lid, and its progress has been across the right cheek, and now there is a definite, distinct lesion on the outer canthus of the right eye, as in Figure 3.

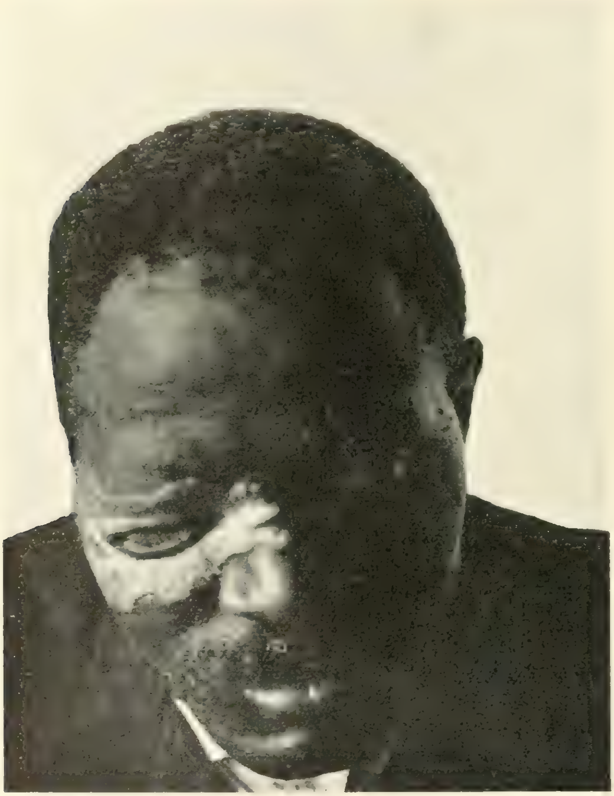

FIG. 5.

Dr. Haase's patient (first seen in March, 1915),—M.C. Picture made March 20th, 1915.

W. R., aged 52 years, male, coloured, seen first on March 27th, 1910. The disease had then existed for fifteen months. It began on the outer canthus of the right eye, and spread both upward and downward, and, then, inward involving the whole of the lower lid and half of the upper lid at the time Dr. Haase saw patient. Dr. Haase grew cultures in his laboratory and demonstrated the organism from each patient.

W. F. N., aged 50 years, male, white, seen first by Dr. Haase on April 2nd, 1914. In this case the first lesion had appeared on the nose eighteen months previously. It then extended across the nose to the lower eyelids, which showed complete destruction of skin at the time Dr. Haase first saw patient. This is the only case in a white man reported from Memphis. Figure 4 was made in April, 1914.

M. C., aged 35 years, male, coloured, seen first by Dr. Haase in March, 1915. The disease appeared on the outer canthus of the right eye and extended downward and upward; destroying the skin of both the upper and lower lids. This is the only case which shows more than one point of infection. Patient has lesions on his arms and leg, but the original lesion appeared at the point first described. Figure 5 was made March 20th, 1915.

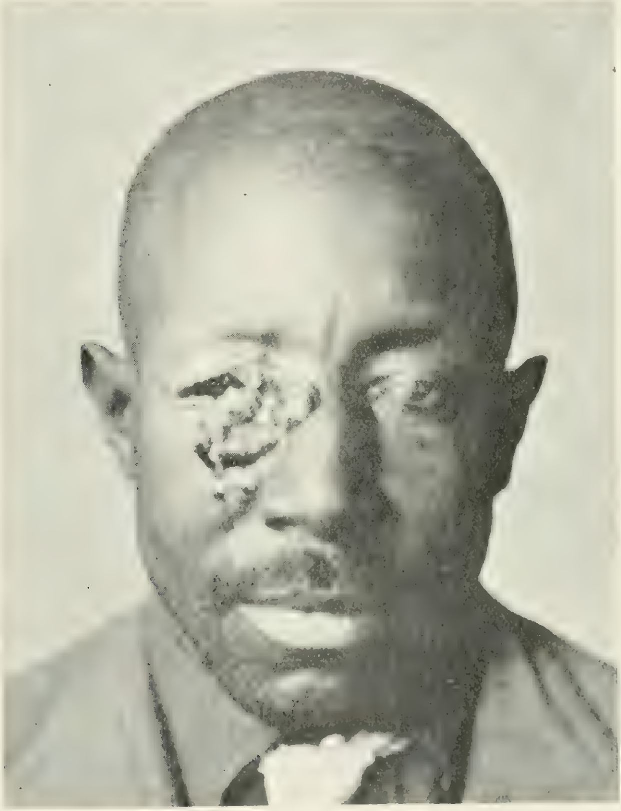

FIG. 6.

Dr. Fagin's patient.—Richard James.
Picture made November 14th, 1913.

History of personal Case.

On November 14th, 1913, Dr. S. H. Liddell, of Rena Lara, Mississippi, brought this coloured man, Richard James, aged 38 years, to me for consultation and treatment. Dr. Liddell told me that the man had worked on a farm for many years; that he was married and had several children; that he had always enjoyed good health; and that even his present eye condition did not keep him from making a full hand in the field.

When the large eye-flap, which the patient wore to protect his right eye was removed, the view, same as in the picture (Fig. 6) was seen. The growth around the eye protruded outward, perhaps from one-half to an inch in elevation, was rough and seemed to be in sections, and from the bottom of the growth there was almost a constant flow of purulent secretion. On my history card, the following was written: "Two years ago a small growth or stye was noticed on upper lid near outer canthus of right eye. This grew and soon resembled a wart. Others came, and Dr. Reid, who was at Rena Lara at that time, removed them. In a short time the growths returned, so the patient then went to a hospital at Natchez for operation. Again they returned, and the patient went to Vicksburg this time, and was operated on but without success. Five times the growths were cut away, and five times they returned. In January, 1913, the growth came on the inner canthus and lower lid. It had never caused any pain, but from its warty appearance and tendency to return, the diagnosis of cancer (epithelioma) had been made. Specific history denied, yet mixed treatment had been given freely."

With a history like the above, my first impressions naturally made me think the growth to be either specific or malignant. Up to this time I had never seen a case of blastomycetic dermatitis of eyelids, so, in my own mind, I was certain that a section of the growth, or a Wassermann, would be absolutely necessary to reveal the true pathology. To myself, I had given up the idea that a positive diagnosis could be made clinically, but, as is our custom, when an interesting case comes in, I called my partners, Drs. Hill and Simpson, to see it. As soon as Dr. Simpson examined it and went over the history, he said he was positive that the condition was that of blastomycetic dermatitis. He said that a few years ago he had a patient with a similar lesion, which proved to be a blastomycetic infection. This gave a new turn to our thoughts, and furnished the first hint toward the true diagnosis. We found each warty growth to be composed of very small abscesses—miliary abscesses, each little abscess filled with pus, which came out freely under pressure. We found, also, that the conjunctiva was not affected by this disease, a very good diagnostic point, because an epithelioma as extensive as this would have attacked the conjunctiva too.

The patient was told to come back to my office that afternoon. I had a picture made of him (Fig. 6), and then took him out to the University of Tennessee Clinic to show to my eye section, also to the skin section. On my way out to the college, I chanced to meet two of our best surgeons. They both said, "Cancer; cut it out." Dr. Haase, who has charge of the Dermatological Clinic, confirmed our diagnosis clinically, but, at my request, went with us to the Pathological Department and took some of the pus, also part of the section of tissue, which was removed for diagnostic purposes. Blood was taken for the Wassermann reaction, and urine for examination. Each was negative.

Pathological Reports.

University of Tennessee,
Pathological Department.

(1)

Pathological report of tissue sent to Laboratory, November 14th, 1913, by Dr. Fagin.

The following are the microscopic findings of a section of tissue removed from a growth of eyelid:

The epithelial cells of the epidermis are hyperplastic, especially are the deepest layers. There is a distinct limited infiltration of the corium by these epithelial cells, resembling, in this respect, an epithelioma.

The cells of the epidermis show an invasion by polymorphonuclear leucocytes, in places appearing in clusters.

The corium showed inflammatory infiltration, especially with lymphocytes.

Diagnosis: Blastomycetes infection of eyelid.

(Signed) H. T. Brooks, Pathologist.

812, Memphis Trust Buildings.
Memphis.

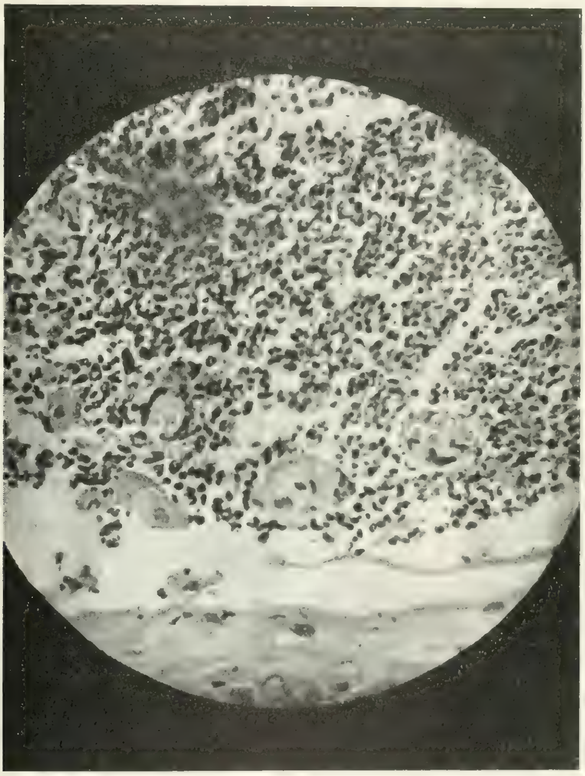

Fig. 7.

Several Organisms found by Dr. Haase in Dr. Fagin's patient, Richard James.

(2)

Dr. Fagin,

Dear Doctor,—The microscopical examination of tissue removed from the lesion on the eye showed the following:

There was an abscess of the superficial layers of the epidermis and a hypertrophy of the other layers, especially of the prickle cells, producing considerable down-growths into the corium. I found numerous miliary abscesses in the hypertrophied tissue, in some of which blastomycetes were found. One section showed a sinus connecting two rather large abscesses, and within this sinus more blastomycetes were found, some of which were of the budding form (Fig. 7).

So I have no hesitation in confirming your diagnosis of blastomycetic dermatitis.

(Signed) MARCUS HAASE.

With the reports before us, from Dr. Haase and Dr. Brooks, proving our diagnosis was correct, our thoughts next turned to treatment.

Treatment.

My patient was given large doses of potassium iodide internally, while X-rays were applied locally. Dr. Lawrence, of Memphis, gave the X-ray exposures—twenty in all—extending over a period of three months. The administration of a saturated solution of potassium iodide was started, even before the laboratory reports came in. This was steadily increased until the patient was taking three hundred drops a day, or one hundred drops at a dose. From the beginning the combined treatment caused the growth gradually to disappear. By Christmas it was half gone, and in the early spring the X-ray exposures were discontinued. The entire growth had apparently disappeared; yet the potassium iodide was continued, but in smaller doses.

In April, 1914, at the meeting of the Tennessee Medical Society, here in Memphis, Dr. Haase and I had a joint paper on Blastomycetic dermatitis in which I discussed the eye lesion. My patient, together with some of Dr. Haase's patients, was exhibited before the Society. The skin lesion at the time was practically healed, and there was very little ectropion. My patient went back to his work on the farm the next day, and I saw him no more after this. On the first day of June, 1914, after a hard day's work, he came into his home, ate a hearty supper, and, while sitting in his porch that night, complained of feeling ill. He soon became unconscious, and Dr. Liddell, his family physician, was called in. Dr. Liddell wrote me that the patient died before morning, and that a *post-mortem* examination was refused. Except a paralysis of one side of the body, Dr. Liddell knew nothing more. We are all wondering if a blastomycetic lesion formed in his brain. If not, then what caused this man's death?

Facts regarding a Blastomycetic Infection.

1. Gilchrist, in May, 1894, found the organism in this disease. He called the organism a "blastomycete," and named the skin infection, which was caused by this blastomycete, "Blastomycetic dermatitis."
2. This organism, which is a yeast-like fungus, usually selects the skin. Yet, as we have already stated, lesions of the lungs, kidney, liver, bone, etc., have been described. Only one instance can be found in the literature in which a mucous membrane was affected.
3. Twenty-five per cent. of the skin lesions are found in the region of the eyelids, but the conjunctiva remains unaffected, and suffers only from exposure, while in cancer the conjunctiva sloughs away too.
4. It seems to be entirely an American disease. No cases are as yet reported from abroad. The majority of the cases occurred in the Mississippi Valley, and were studied and reported in Chicago. Foreign-born people, who have it, receive the infection after immigration to this country.
5. We are indebted to Bevan, who first observed, and to Nevine, Hyde,

and Montgomery, who have substantiated the fact, that the iodides are almost a specific for Blastomycetic dermatitis. We are told by Bevan to increase the dose of potassium iodide, if necessary, to one hundred and fifty grains three times a day. X-ray treatment is beneficial. Recently, a case has been reported as cured by injections of salvarsan.

THE TELEPHONE ATTACHMENT IN EYE SURGERY*

BY

SIR JAMES MACKENZIE DAVIDSON, M.B., C.M.

LONDON, ENGLAND.

It has given me much pleasure to accept the invitation of the Congress to demonstrate the possible utility of the telephone in the extraction of non-magnetic foreign bodies from the eyeball and orbit. The use of the electro-magnet in cases in which the foreign body is of a magnetizable nature has been of great value in ophthalmology, furnishing a means of saving many eyes which otherwise would have been lost. Hitherto the presence in the eyeball of a piece of non-magnetic metal, unless in some part of the eye clearly visible to the surgeon, has generally meant that the eyeball must be sacrificed. I hope to demonstrate to-day that by means of the telephone attachment it may be possible to detect and to extract from the eye small particles of metal of non-magnetic character. However minute the particle, it is capable of detection quite distinctly by means of the telephone.

The need for such a method at the present time requires no insistence. Modern warfare, carried on in deep trenches, renders the soldier peculiarly liable to wounds in the head, owing to the frequency with which the head is exposed, and flying particles of shell, especially from hand grenades, account for the very common occurrence of particles of metal embedded in eye or orbit.

More than thirty years ago, Professor Graham-Bell, speaking of the unsuccessful attempts which had been made some time previously to determine the position of the bullet in President Garfield's case by means of the induction balance, suggested that a telephone might have possibilities in this connection. To one terminal of the telephone a fine needle was to be attached, and to the other terminal a plate of metal of the same nature as the needle. The plate being placed on the limb to be examined, and the needle thrust in at the point where the bullet was believed to be situated, a galvanic battery would be formed within the body whenever the needle struck the ball, and this would cause a click to be heard in the telephone.

Graham-Bell's remarks were quoted in the *Lancet*[1], and, having read them in that journal, I applied the method to certain surgical cases in Aberdeen as long ago as 1887. I used a silver plate on the patient's skin and a silver probe to search the wound. Subsequently, this telephone probe was used under Sir Frederick Treves's direction in the South African War[2]. The device was successful within limits, but its application was restricted owing to the apparantly necessary condition that the probe or other instrument used for exploration must be of the same metal as the plate placed on the patient's skin. It is only since the present war began that, observing the very considerable difficulty sometimes encountered during the procedure of extraction, I set about making experiments, and found that the telephone worked quite well with different metals, and, indeed, could be used for any metallic instrument to which the surgeon chose to attach it. Ultimately, I found that the best results were forthcoming if a plate of carbon were used as the indifferent electrode, especially after the carbon had been submitted to a slight wash of iodine solution as a depolarizer. Whatever the combination, whether the metal sought for be lead, nickel, copper, iron, or the iron alloys used in shell manufacture, and whether the surgeon's instruments be of steel or silver, or be nickel-plated, always the most distinct sound is elicited when the plate of carbon is employed.

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* Read at the Oxford Ophthalmological Congress on July 15th, 1915.

Since first publishing this method in the early part of the present year,[3] I have found, what was previously unknown to me, that ten years ago Captain William Sheen, of the Royal Army Medical Corps, published an account of a telephonic method very similar to the one I have recently adopted[4]. His practice was to use a silver plate on the skin, and a silver wire to connect with the instrument itself. The advantage of the carbon plate, as against the silver, is that it is so readily obtainable (the carbon used in the ordinary bichromate cell serving the purpose), is practically indestructible, and requires little or no attention.

Mention should also be made of Pratt's electro-probe, described in Colonel W. F. Stevenson's book, "Wounds in War[5]." This is evidently a telephone detector with a small battery in circuit. Although a weak generator of electricity, the battery is quite powerful enough for its purpose when combined with a microphone for mutiplying the sound produced on making and breaking the circuit. Colonel Stevenson also states that a microphonic bullet probe had already been made and patented by Albert Klein, of Ghent, but that the advantage of Pratt's instrument lay in the excellence of the battery. The introduction of a battery into the circuit, in my opinion, has no very marked advantages, and is open to the objection that stray and misleading sounds may be induced in the telephone.

Of electrical indicators other than telephonic, quite a number have been devised, the chief of them being De Wilde's electric bell, in which the action, as described by Longmore in his "Gunshot Injuries[6]," is excited in a suitable cell, and increased in intensity by the intervention of a multiplying coil. A special exploring probe is connected by insulated wires with the apparatus, and when the circuit is completed by contact of the two points of the probe with a bullet or fragment of shell, the indication is given by the striking of a hammer against a bell. This method, as well as a similar one by Krohne and Sesemann in which the proof of contact is afforded by the movements of a fine needle upon a small dial-plate, is stated to have been used frequently with advantage among the invalided soldiers at Netley in former years. The telephone, as I shall hope to demonstrate, however, gives a clearness and a fineness to the indications, which is of inestimable value, especially in ophthalmic surgery, when combined with precise measurements obtained by the X-ray method.

The action of the telephone, as is well known, depends upon variable currents passing through the coil of wire which is wound around one pole of a permanent magnet; these currents cause variations in the magnetic strength and lead to the attraction and release of a small, thin iron disc placed in front of the magnet, the vibration of the disc resulting in the emission of sound waves. A low resistance telephone has been found the most suitable for detecting these small currents. It is an advantage, although not essential, to have double receivers, and by means of a headband, the telephone can be so attached as to leave the surgeon's hands entirely free.

The skin of the patient is moistened with the usual salt solution, in order to reduce the resistance of the tissues, and the plate of carbon is fixed in position with bandages or plaster. To this plate, one end of the telephone wire is attached, and the other end takes the form of a bare disinfected thread, preferably of silver, which is bound round, or, what is better, spring-clipped on to the surgical instrument.

No sound is heard in the telephone as the needle or other instrument comes in contact with the tissues, or, if anything is audible, the sound is not to be confused for a moment, even by the least experienced person, with the click which is heard when the instrument touches the embedded metal. When a rubbing contact is made between the instrument and the foreign body, the buzz, or, more properly, the crepitation, is unmistakable in its distinctness. A very necessary precaution to be observed is that no metallic instrument already in the wound shall be touched by the instrument attached to the telephone, as this will confuse the indications. To avoid this difficulty a rubber drainage tube may be placed over the exploring instrument, save for the neighbourhood of its point. The great advantage of the telephone is in the constant control which it permits to be exercised over the foreign body by reason of the microphonic rattle.

In ophthalmic surgery the special utility of the telephone attachment is sufficiently obvious. The best way of demonstrating it is to use small pieces of gelatine in which particles of various metals have been buried. When this gelatine is laid upon the plate of carbon connected with one pole of the telephone, the exploring instrument attached to the other pole, and the receiver held to the ear, no sound will be heard until the metal particle is touched, when the characteristic microphonic rattle will be produced. Experiments can also be tried, with more approximation to the actual conditions of surgery, upon the eyes of pigs, but to facilitate matters, it is well to remove the vitreous, and allow its place to be taken by gelatine, which is poured in and allowed to set. The vitreous of the eye, unfortunately, is of so yielding a nature as to prevent good metallic contact, a layer of vitreous intervening between the extremity of the instrument and embedded metal itself. When the metal substance is lodged in the coats of the eye, however, the sound is heard immediately and unmistakeably. For details of cases in which small pieces of shell in the orbit were successfully extracted by recourse to this method, I may refer the reader to my original paper.[3]

Quite recently, Mr. R. R. Cruise had a patient at the Third London General Hospital who was found, on *X*-ray examination of his right eye, to have a small particle of metal, about 2 mm. in length, inside his eyeball, but quite close to the sclerotic, about 12 mm. back from the centre of the cornea, and in the lower and nasal quadrant. As the particle proved to be non-magnetic, a large magnet having apparently no effect upon it, its removal was attempted with the aid of the telephone. On rotating the eyeball upwards, and dissecting back the conjunctiva from the sclerotic, a small spot of bluish-black discolouration was seen at a point in the sclerotic corresponding to the estimated position of the foreign body. A needle attached to the telephone in the way already described was run into the vitreous cavity, and gave the characteristic crepitation due to touching the metal. On making an incision with a Graefe knife, the sound was again heard, and then the forceps were attached to the telephone and introduced, and an attempt was made to grasp the foreign body. Unfortunately, it slipped, and could not subsequently be detected. The patient is to be *X*-rayed again with a view to ascertaining the present position of this particle.

Although in this instance Mr. Cruise failed to extract the particle, it seems advisable to place the case on record as showing how a small particle like this could be detected in the living human eye by means of the telephone. This in itself is of considerable interest, although, of course, the mechanical difficulties of seizing these small particles and holding and extracting them through the sclerotic must always remain somewhat formidable. Even if this first attempt at using the method has failed, the case suggests a promise of possible successes in cases of this kind, and I trust that ophthalmic surgeons will give the method a trial, and report the result of their experiences in due course.

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CHRONIC SERPIGINOUS ULCERATION OF THE CORNEA (MOOREN'S ULCER*).

BY

STEPHEN MAYOU, F.R.C.S.,

LONDON, ENGLAND.

THIS disease, although recognised as early as 1849 by Bowman, was first described as a clinical entity by Mooren in 1867. It is a chronic ulcer with a serpiginous outline which first makes its appearance at the corneal margin, and in three-fourths of the cases in the exposed area of the palpebral fissure, and, as a rule, in time involves the whole of the cornea. The base of the ulcer is greyish in colour; the spreading margin is deeply undermined, and has an overhanging edge of proliferating epithelium. There is no discharge and no ciliary injection, unless pyogenic organisms are present. As the disease spreads, the portion that has been involved heals, the epithelium growing over its surface. There is little or no tendency to formation of new fibrous tissue, as after the healing of an ordinary corneal ulcer, so that when the ulcer has entirely healed, there is a loss of about half the thickness of the cornea. Cicatricial tissue not being present, the opacity which follows is comparatively slight, so that fair vision may be restored. Rarely, as in the case which I am showing pathologically to-day, the whole cornea has been involved and has healed, but has broken down again and started to ulcerate. Nettleship (*Trans. Ophth. Society U.K.*, Vol. XXII, 1902, p. 103) has pointed out from an analysis of a number of cases, that the disease occurs between the ages of 23 and 71 years, but is most common between 40 and 60 years, and affects both eyes in about a quarter of the cases.

Much discussion has arisen as to the pathology of the condition. J. B. Lawford (*Royal London Ophthalmic Hospital Reports*, Vol. XII, p. 266, 1889) examined the first case, and subsequent cases were investigated by German authors, and reported as being "Rodent ulcer." This was probably due to the peculiar downgrowths of the proliferating epithelium which are found at the edge of the ulcer trying to cover the necrosing cornea beneath, but in other respects, both pathologically and clinically, the ulceration does not behave like this disease, and the idea has now been generally abandoned. Andrade (*Ann. di Ott.*, XXIX, 1900), put forward a bacterial origin as the cause of the disease. In a case he found a small motile bacillus grouped like the Morax-Axenfeld bacillus, growing in pairs and chains, and having similar staining properties. Confirmation of this bacillus as the cause of the disease is still wanting, and in three cases which have been examined by the author it has not been isolated. This also has been the experience of several other observers. The behaviour of the ulcer and its pathological appearance do not favour the view of a bacterial origin, and it is probable that this organism found by Andrade was merely a saprophyte growing in a necrosing tissue. W. T. Lister (*Royal London Ophthalmic Hospital Reports*, XV, p. 352 1903), has described a very beautiful specimen of the spreading stages of the disease. He showed a necrosis of the superficial layers of the *substantia propria*, and round the necrosing tissue an exudation of leucocytes, chiefly of the mononuclear variety. This does not necessarily mean that the disease is of inflammatory origin, as the presence of the necrosing tissue with saprophytic micro-organisms growing in the necrosing tissue would be quite enough to account for the leucocytosis.

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*Read at the Oxford Ophthalmological Congress on July 15th, 1915.

The specimen shown to-day is from a woman, aged 63 years, with the duration of a year-and-a-half, in which the whole cornea has been involved. It will be seen that there is a loss of quite half the thickness of the cornea, with the formation of no new fibrous tissue; the *substantia propria*, is covered with thickened epithelium which has spread from the conjunctiva. In one situation at the limbus, the whole process has started to commence again, a small ulcer has formed, and is breaking down, involving about half the thickness of the remaining *substantia propria*, and it was for this reason and on account of the pain that the eye was removed.

The cornea being a non-vascular tissue, is very liable to undergo degeneration, leading to atrophy or destruction of its layers.

The character of the necrosis and the fact that it nearly always involves the whole cornea and never perforates, together with the absence of the signs of inflammation when free from pyogenic organisms, and the fact that there is little or no attempt at the formation of fibrous tissue to replace the loss of the *substantia propria* make the author think that the condition is due to a necrotic process of the superficial layers of the *substantia propria* of the cornea as a result of defective nutrition. This is further borne out by the fact, that the ulcer in three-fourths of the cases occurs in the portion exposed in the palpebral fissure; and Hillemanns (*Arch. f. Augenheilk.*, XL, 1899) has shown that the anterior ciliary vessels, which supply the nutrition to this layer of the cornea, manifest signs of degeneration and contain hyaline thrombi.

The treatment of the condition is, as a rule, highly unsatisfactory. The author wishes, however, to record one case in which a cure resulted without the cornea being completely involved and which has remained well for two years.—Miss W., aged 39 years, came to me on November 29th, 1912, with a typical Mooren's ulcer occupying about one fifth of the cornea upwards and inwards int he right eye. The eye was free from all discharge, and showed practically no ciliary injection, the ulcer having a grey base with one or two vessels passing under it and a typical undermined spreading edge. The ulcer was examined for micro-organisms but nothing was found beyond one or two colonies of staphylococcus albus. The patient was treated for a month by pure carbolic acid and the actual cautery, with little or no effect. She was a thin anæmic woman and had pyorrhœa alveolaris badly and all her teeth were removed. At the beginning of January a paracentesis of the anterior chamber was performed upwards and inwards, and the aqueous was evacuated daily with an iris spatula. This was continued for three weeks, and the wound was then allowed to heal. The ulcer showed distinct signs of flattening of the active margin and the epithelium was spreading over from the conjunctival surface. In March a similar paracentesis was again performed, and the wound kept open. By the beginning of May, the ulcer had completely healed. The patient's general health has very much improved since that date, and she had no further trouble with the eye.

CLINICAL MEMORANDA.

THE STRIATE CLEARING OF CORNEAL CICATRICES.

BY

SYDNEY STEPHENSON, D.O. (Oxon.)

LONDON, ENGLAND.

Introductory.

THERE is a curious metamorphosis sometimes undergone by cicatrices of the cornea that does not appear yet to have received the attention it deserves. I refer to the condition known as "Striate clearing." The appearances are characteristic, and as no cases, with the exception of the two to be described immediately, appear to have been reported from this country, we may fairly conclude that the condition has excited no particular attention in England.

So far as I know, an account of the pathology of this singular condition has yet to be published.

Cases.

1. Jane L——, aged 26 years, first seen by me in October, 1906, with the history that both eyes had been badly inflamed nine years ago, and that the more or less acute condition had lasted for several months.

The family history was unknown.

No dental stigmata of hereditary syphilis, but fine rhagades were present at the angle of the mouth on the right side. The condition was one of residual opacities of each cornea, the result of interstitial keratitis. Each cornea was the seat of Hirschberg vessels, and of somewhat striking-looking opacities. As regards the right eye (shown in Fig. 1) the opacities, which roughly occupied the middle parts of the lower half of the cornea, form an exceedingly pretty figure, and remind one of a feather or of a pressed fern. To bring out the finer points, it was necessary to use a magnifying glass. Right vision, 5 5 partly. As regards the left eye, a similar but less well-marked design was present in the central parts of the cornea. Left vision, 5/9. It should be added that there were some pigmentary changes towards the periphery of the lower hemisphere of the left fundus.*

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* *Trans. Ophthal. Society U.K.*, Vol. XXXIII, 1913, p. 79.

THE STRIATE CLEARING OF CORNEAL CICATRICES.

BY

SYDNEY STEPHENSON.

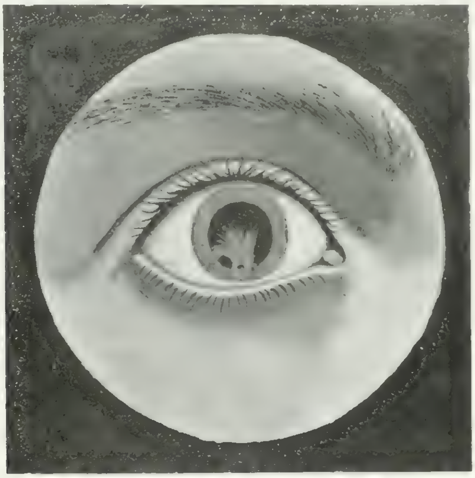

FIG. 1.

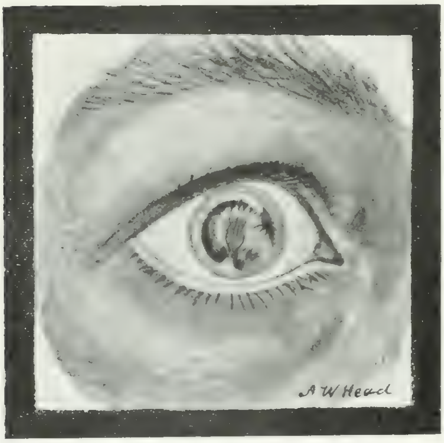

FIG. 2.

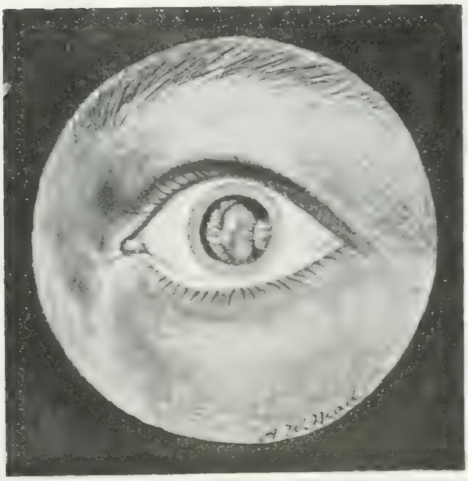

FIG. 3.

2. The patient, a man of 65 years, has been under my observation since February 2nd, 1915. He tells me that he was troubled with inflamed eyes from the time he was two or three years of age until he reached manhood. At twelve years of age he suffered from abscesses on the left side of the neck, the scars of which can still be seen. He has, indeed, never enjoyed good health. Three years ago, his hair fell out, so that he is now compelled to wear a wig.

The corneæ are the seat of leucomata, the right being more affected than the left. The opacity in the right eye, as shown by Fig. 2, is roughly mushroom-shaped, its stalk lying at the lower edge of the cornea. It covers the pupil. Its peculiarity consists in the fact that it is traversed by a number of clearer lines, the effect of which is to break it up, as it were, into a number of smaller or larger leucomata. The changes are best seen on using a magnifying glass. Towards the upper margin of the cornea is a curvilinear and denser opacity, which fits cap-like over the main leucoma, leaving a clear interval between the two. R.V. 6/36.

The striate changes are less marked in the leucoma of the left cornea (Fig. 3). They form, so to speak, so many fringes to the margin of the main opacity. L.V. 6/24.

Remarks.

An inspection of the figures shows that the condition presents a strong family likeness in each case. In Figure 2 the changes are on a much coarser scale than those depicted in Figure 1. The latter may be termed "fine striate clearing," and the former "coarse striate clearing" of corneal scars. The cause of the corneal opacity in the first case was interstitial keratitis (inherited syphilis), and in the second repeated attacks of phlyctenulosis in comparatively early life. Evidently, therefore, the existence of the striæ has nothing whatever to do with the cause of the leucomata. In both cases the corneal condition was of long-standing, and in neither did the striate clearing show any obvious change while the patients remained under my personal observation.

The clear lines, more especially in the first case, remind one of blood-vessels, and it is probable that such were present when the opacity was recent. The present condition has likely followed the more or less complete resorption of the vessels, but inasmuch as many of the striæ are wider than any corneal vessel, there has almost certainly been some clearing of the opacity in the vicinity of the vascular streams.

It is quite possible that the striate metamorphosis is commoner than is at present suspected, for it may be overlooked in the absence of a careful examination, as in the left eye of my second patient (Fig. 3).

E. Fuchs was the first to draw attention to the condition, and his original communication (*Beiträge zur Augenheilkunde*, Band II, p. 1, 1895) includes sketches of the change. Fuchs recognised three groups according to the arrangement of the lighter lines, as follows:

(1) The cicatrix is divided into polygonal, triangular, or square areas, or into more complicated figures, by the striæ;

(2) A star-shaped figure results from a radial disposition of the light lines; and

(3) An arc or bow-shaped area is produced by the striæ, encircling a marked central opacity, or the cicatrix is traversed by the striæ, which do not admit of any precise arrangement.

Fuchs laid stress upon the fact that the striate appearance of a corneal opacity always indicated that the scar had lasted a long time. Most of the cases were observed in elderly people, in whom the cicatrices had originated in childhood or youth, and therein lay the diagnostic value of the appearance. The condition was also mentioned by Fuchs in his classic *Text-Book of Ophthalmology*, 4th English edition, p. 303, where an excellent illustration is given.

In the discussion that followed the showing of my second patient before the Ophthalmological Society of the United Kingdom (April 23rd, 1915), W. T. Holmes Spicer exhibited drawings made by himself of several instances of striate metamorphosis, a condition which he had been interested in for some years.

MENTAL RETARDATION, NUTRITION, AND EYESIGHT IN SCHOOL CHILDREN.

BY
H. R. BURPITT, M.D.,
NEWPORT, MON.

THE present inquiry was suggested to me by the observance of the general association of normal eyesight and excellent nutrition, and, on the other hand, of the occurrence of poor or bad vision in badly-nourished children, even when examination of the eyes failed to reveal any abnormal refraction or pathological condition.

The eyesight of a child is an index to its nutrition for the following reasons :—

Owing to hypermetropia, which is the normal condition of the eyes of school children, good vision is dependent on accommodative power, *i.e.*, tonicity of the ciliary muscle. Astigmatism is often present, and yet if the ciliary tone is good, 6/6 vision is obtained. Therefore, a normally nourished child, as a rule, possesses 6/6 vision.

Debilitating causes, such as illness, faulty environment, inadequate or insufficient food, which produces malnutrition, affect the tonicity of the ciliary muscle just as they do that of the gastric, intestinal, cardiac, or voluntary muscles. When we consider the extreme delicacy of the ciliary muscle and the large amount of work (not intended by nature) it performs, one can readily understand how easily and rapidly it may be affected by these injurious causes.

In the case of myopic children, the failure to get good D.V. is not a question of failure of accommodative power, but still (except in that small proportion of congenital cases) the poor sight is an index of past, and frequently present, debility which has lasted sufficiently long to produce those abnormal conditions of the eye which are cause of myopia.

Table I. shows in percentages the state of nutrition in children of different visual acuities.

TABLE I.

Ages 13 *to* 14.

Visual acuity	$\frac{6}{6}$	$\frac{6}{9}$	$\frac{6}{12}$	$\frac{6}{18}$	$\frac{6}{24}$	$\frac{6}{36}$	$\frac{6}{60}$
Number of children	111	122	104	103	63	31	10
Nutrition A.N.	55	29·5	16·3	11·6	11·1	19·3	—
,, B.N.	5·4	5·7	8·6	13·6	17·4	22·5	30

Of the children in the highest standard of nutrition (A.N.) the 6/6 group claims a higher percentage than any of the other groups. Similarly, the percentage for 6/9 is higher than for 6/12, and so on with the exception of the 6/36 group. The figures are still more convincing when we consider the next line of subnormally nourished children. The 6/6 column containing the lowest percentage of these, followed by a progressively higher percentage in each succeeding column.

A study of the backwardness of these children presented in the following table, shows that the relationship between it and eyesight is similar to that between nutrition and eyesight as just shown :—

TABLE II.

Ages 13 *to* 14.

	Total Number.	% in Std. 7.	% in Std. 6.	% in Std. 5.	% in Std. 4.	% in Std. 3.	% in Std. 2.
Normal Vision both eyes $\frac{6}{6}$	111	36·9	26·1	22·5	11·7	2·7	—
,, ,, ,, ,, $\frac{6}{9}$	122	24·6	36·1	21·3	11·5	4·9	1·6
,, ,, ,, ,, $\frac{6}{12}$	104	17·3	28·8	30·8	16·3	5·8	1·
,, ,, ,, ,, $\frac{6}{18}$	103	22·3	28·1	27·2	13·6	7·7	1·
,, ,, ,, ,, $\frac{6}{24}$	63	25·4	25·4	28·6	14·3	6·3	—
,, ,, ,, ,, $\frac{6}{36}$	31	12·9	48·4	19·3	9·7	9·7	—
,, ,, ,, ,, $\frac{6}{60}$	10	20·	20·	20	30·		10·

Facts indicated by Table II :—

There is less backwardness among the 6/6 group than the others. The majority of these children have reached the highest standard (VII).

Of the 6/9 children, a fair number have reached standard VII, but the majority are in standard VI, *i.e.*, one standard behind those of normal sight. The same thing happens with the next group, the 6/12, the majority being only in standard V. This condition of affairs now stops (6/18), and more of the children appear in standard VI and VII, possibly because it is usual, according to the custom of school inspection, for these children to obtain glasses, which enable them to regain lost ground.

However, generally speaking, the worse the vision, the more is the child retarded mentally. The findings of the table are put more forcibly, if we consider as seriously retarded those children who have not reached standard V (*i.e.*, three years behind), then

the children with vision 6/6 are represented by 14·4 per cent.
,, ,, ,, ,, 6/9 ,, ,, ,, 18·0 ,, ,,
,, ,, ,, ,, 6/12 ,, ,, ,, 23·1 ,, ,,
,, ,, ,, ,, 6/18 ,, ,, ,, 22·3 ,, ,,
,, ,, ,, ,, 6/24 ,, ,, ,, 20·6 ,, ,,
,, ,, ,, ,, 6/36 ,, ,, ,, 19·4 ,, ,,
,, ,, ,, ,, 6/60 ,, ,, ,, 40·0 ,, ,,

As 14·4 per cent. of children with normal sight are retarded three years, it is evident that bad eyesight (and if the argument holds good, malnutrition) is not the only cause of backwardness, this 14·4 per cent. is composed of children, who are inattentive, dull, mentally deficient, or irregular in attendance, such children should be present in equal proportions in all the different grades of vision, and, therefore, the fact that the numbers in the right-hand column increase as we go down, proves that with diminution of visual acuity there is an increase in mental retardation.

Malnutrition, defective eyesight, and backwardness are, therefore, closely associated. The causative factor is undoubtedly malnutrition. Much has been done by education authorities, chiefly in the way of amelioration by the establishment of school clinics. In the interests of the child, the nation, and the educational system, the problem of malnutrition should be more thoroughly dealt with. This is a matter of improving home conditions, an adequate system of feeding, improved hygienic conditions of the classrooms, and open-air residential schools for every area. The latter are of proved value for nutritional diseases of children, and, I feel sure, are the appropriate treatment for many cases of bad eyesight.

(?) PARINAUD'S CONJUNCTIVITIS IN A CASE OF MUMPS ASSOCIATED WITH NEURO-RETINITIS AND ALBUMINURIA.

BY

D. V. GIRI, D.O. (OXON),

LIEUT. I.M.S. KITCHENER INDIAN HOSPITAL (NO. 1 INDIAN GENERAL HOSPITAL),
BRIGHTON, ENGLAND.

LANCE NAICK, D.S.T., aged 28 years, was affected with mumps on February 29th, 1915, while in France. The attack is said to have been ushered in by fever and swelling of both parotid glands. He was treated in a base hospital in France during the acute stage of the infection, and afterwards transferred to Kitchener Indian Hospital, Brighton, on March 10th, 1915, when the swelling of the parotids and the fever had subsided, and came under the care of Major W. S. Willmore, I.M.S.

As the patient complained of marked diminution of vision, which commenced a few days after the onset of the mumps, I was asked to see the case.

I found the patient very weak, and rather anæmic and sallow-looking. He complained of constant headache, giddiness, and inability to see well. He had a high-tension pulse (blood pressure, 175 mm. of Hg., Leonard Hill's pocket sphygmometer), regular, 85 per minute. The radial arteries were extraordinarily thickened and tortuous for a man of 28 years.

Ophthalmoscopic examination revealed double optic neuritis. There were hæmorrhagic and exudative patches in the retina, involving the macular region in both eyes. Some of these hæmorrhages were beginning to clear up and were apparently a few weeks old, and some were recent. The arteries were small, the veins dilated and tortuous. The neuritis appeared to be of about the same intensity on both sides. The disc margins were completely blurred and the discs choked with exudation, so that no physiological cupping and no markings in the laminae cribrosae were visible. The discs were not measurably swollen. V.=hand movements close to eye. Pupils active. Media clear. T.n.

Examination of the urine, which was acid, and had a sp. gr. of 1012, showed a heavy cloud of albumin (0·3 parts per 1000).

The treatment consisted of rest in bed, milk diet, potassium iodide and aspirin internally, and 1 per cent. atropin drops to the eyes. The eyes were shaded and the bowels regulated.

Five weeks later, on April 20th, 1915, I made the following notes:—

"The neuritis is subsiding. The nasal edges of the discs are beginning to get defined. A pale white is replacing the original grey striate appearance of the disc contours. The vessels are tortuous and here and there obscured by exudate as before, but the veins are less congested. The hæmorrhages have all turned more or less white. The patches of exudate are less fluffy and whiter than before. Vision worse. Patient's general condition stationary. Albumin content of urine as before."

About ten weeks later, on June, 7th, 1915, I was again asked to see the case because of some acute trouble in the right eye which had developed suddenly a couple of days previously, with *malaise* and pain in the eye and supra-orbital region. As the patient did not complain at the onset, no temperature had been taken during the two days preceding my examination, and hence I am unable to state whether or not his *malaise* amounted to actual fever and what the height of it was. I found the conjunctiva of the right eye markedly chemosed. There was severe conjunctival injection. The patient complained of pain in and about the eye. Media clear. Pupil active. Movements of eye full, although slightly painful. No noteworthy exophthalmos. Preauricular gland somewhat swollen. Some mucopurulent discharge. No granulation or ulceration of conjunctiva. Left eye, externally normal.

Aspirin, grs. 10, three times a day internally, 2 per cent. boric lotion to eye, boric fomentations and 2 per cent. boric ointment to be applied to lid margins at bedtime, were prescribed.

June 9th, 1915.—Increase of chemosis of bulbar conjunctiva below cornea. Less pain.

June 10th, 1915.—Diminution of chemosis and pain further lessened.

June 14th, 1915.—Complete subsidence of chemosis, slight conjunctival injection. Hardly any pain. Preauricular gland smaller.

June 22nd, 1915.—R.E. externally normal. Swelling of preauricular gland completely subsided.

Remarks.

Here is a case of conjunctivitis which has an acute onset attended with *malaise*, is uniocular, and involves the preauricular gland. The disease ran a course of over a fortnight. The fellow eye was untreated and remained perfectly quiet in the meanwhile. The treatment was purely symptomatic and as mild as could be. Except for the absence of granule formation in the conjunctiva the condition agrees in every respect with the affection known as Parinaud's conjunctivitis. But the presence of granules, or ulcers, is said to be by no means a constant component of the clinical picture of Parinaud's malady. To the best of my knowledge, the signs and symptoms enumerated above exclude every other condition attended with severe chemosis and conjunctival injection. Hence, I am inclined to look upon the case as one closely allied to, if not identical with, Parinaud's conjunctivitis.

There is no question of contagion from lower animals, as the disease developed three months after the patient's coming into hospital. His being confined to bed all the time he has been in hospital, owing to his extreme weakness and poor vision, only heightens the assurance of absence of contagion from animals to which Parinaud attributed the malady that bears his name. Previous to the onset of mumps he was either in the trenches or in camp in France, where there was hardly any likelihood of exposure to infection from animals. Even supposing that in some mysterious way he was exposed to the contagion while in France, it is highly improbable that the disease had an incubation period of four or five months and during its incubation another acute infectious malady would develop. That the virus of mumps is still active in a sub-acute form in the patient is evident from the persistence of unabated albuminuria up to date and non-improvement of the general condition. I am inclined to attribute the conjunctivitis in this case to the virus of mumps. From this case one gathers that there is more than one causal agent, capable of producing a clinical picture closely allied to, if not identical with Parinaud's malady, and that the presence, or absence, of any of the components of the picture, and the severity or mildness of the case depend on the severity of the infection and nature of the virus, besides the degree of susceptibility of the individual.

Not having any literature to hand on the matter, I am not in a position to refer to similar cases, if any have been recorded. I have ventured to put the case on record in the belief that it is either without precedent or of sufficient interest to bear repetition.

My thanks are due to Col. Sir Bruce Seton, Bart., V.H.S., I.M.S., the officer commanding the hospital, and Lieut.-Col. Austen Smith, I.M.S., officer commanding No. 1 Division, for permission to publish the case, and Major W. S. Willmore, I.M.S., for having kindly placed it in my hands.

NOVELTIES.

THE "SUTCLIFFE" SELF-ADJUSTING SPRING TRIAL-FRAME.*

THE principal feature in this trial-frame consists of the substitution of a spring-bar, such as is commonly used in the ordinary rigid bar astigmatic frame eye-glasses, for the customary trial-frame adjustments for height, projection, and centering. The two right and left eye-cells clip on the nose by means of large smooth shell placquets.

The idea can be applied to any existing pattern of trial-frame, the various modifications of cells, shutters, sides, and goniometer scales remain unaltered according to the choice of the operator. The present model is shown as one pattern only.

The minor novel features of this particular pattern herewith shown are :—

1. A graduation scale with the notation figures in bright relief against a dark back-ground, so that usage and wear increase the contrast instead of decreasing it.

2. A guiding-ring between the two front cell-slots, so as to allow of the easy insertion of trial-lenses in the dark room. This ring, however, if not required, can easily be cut away across its horizontal axis.

3. Broad, flat, extra short, straight sides or temples. The triple spring, pressing the two cells together, so as to press the placquets together gripping the nose, also presses the sides against the head, and takes away part of the pressure from the nose. This form of side combined with the spring-grip allows the frame to be easily put on into position without entanglement or disarrangement of the hair.

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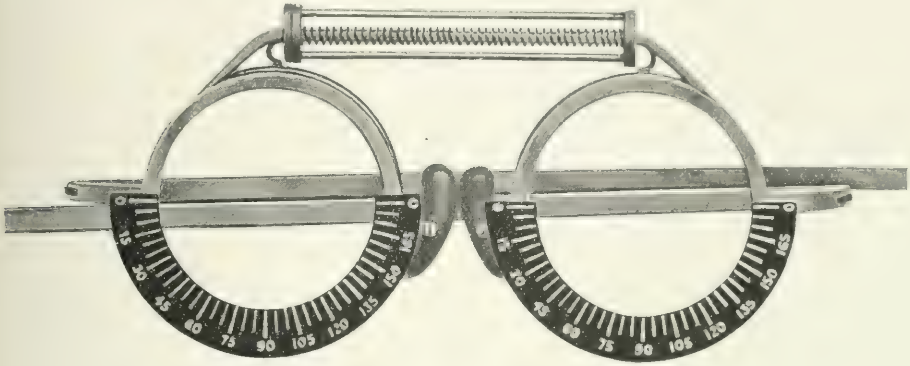
* Appliance shown at the Oxford Ophthalmological Congress, July, 1915.

4. A new form of shell (banana-shaped) placquet, giving a comfortable broad bearing-surface on almost any nose.

5. Lightness of weight. This pattern weighs under three-quarters of an ounce as compared with the ordinary adjustable frame of one-and-a-half to two ounces.

6. Unusual stability and freedom from rock and wobble.

The advantages claimed for this pattern are that all the usual tiresome adjustments are done away with. The most satisfactory way of using it, is to offer it to the patient to be put on by himself, at the same time opening and closing the spring-slide, in order to demonstrate its action. If then, it should happen that the frame has not been placed close enough home to the face, one instantaneous adjustment on the part of the surgeon will complete the movement.



The frame does not slip down the nose away from the eyes. Increase of weight, up to a certain point, actually makes the frame grip tighter on the face.

For presbyopic testing, the frame can be immediately tilted to any angle, or set at any distance on the nose away from the eyes without slipping or moving from the required position.

It may be argued in criticism, that such a frame will not fit or adjust itself to a face with :—

(*a*) Narrow-centered eyes and broad nose, and *vice versa.*
(*b*) High-set eyes and low nose, and *vice versa*
(*c*) A twisted nose, or unequally-centered eyes.
(*d*) Deep-set eyes and projecting nose, and *vice versa.*

This frame has been tried on 100 faces of all kinds, children and adults. The experience shows that the self-adjustability of the shell-placquets and the spring-bar, and the pressure of the sides against the sides of the head, allow of a speedier and more accurate adjustment to the face in a much greater proportion of cases than would be imagined. Even with faces of extraordinary measurements, its non-slipping properties and comfort to the patient outweighed any drawbacks that might have occurred from slight decentration.

It is the invention of Mr. J. H. Sutcliffe and is manufactured in England by Messrs. C. W. Dixey and Sons. It can be made in any existing patterns of trial frame.

THE DIPLOMA IN OPHTHALMOLOGY OF THE UNIVERSITY OF OXFORD: A RETROSPECT.

BY

ROBERT W. DOYNE, M.A., F.R.C.S.,

LATE READER IN OPHTHALMOLOGY IN THE UNIVERSITY OF OXFORD, ENGLAND.

THE fact that I have just been requested to assist in the selection of examiners for the above Diploma, brings the subject somewhat prominently before my mind, for I had the satisfaction of originally mooting the whole matter before the Board of the Faculty of Medicine. The subject aroused keen discussion and a considerable amount of opposition from the majority of what may be called the "London section" of the Board. For my own part, I was quite out of touch and sympathy with the ordinary university procedure, and recognised but dimly the "wheels within wheels" which were involved. Later on, I realised these very completely, and found out how necessary it was to adopt a consistent attitude of *finesse* in smaller details, in order to win the greater game as Reader in Ophthalmology. If I had had a greater aptitude for this attitude and could have played this game, I should have saved myself much work and money, but I confess, without the smallest particle of shame, that I was no match for my opponents in this. Eventually, in order to get the Diploma passed, I had to agree to terms which I protested at the time were quite impossible, and to the incidence of expenses and duties which I never dreamed the University would venture to ask. I was wrong, however. My complaints in this respect I will sum up with the statement that in my attempt to fulfil the obligations placed upon me as Reader, I sacrificed my health and expended nearly £5,000.

The origin of the D.O. arose from several culminating conditions.—At the time of which I speak there was a great tendency among unqualified men to arrogate to themselves, by the use of special titles, special knowledge concerning spectacles and sight, which was granted to them by the unthinking portion of mankind, and resulted in considerable unauthorised practice, often of a harmful description. This, perhaps, is the most important point. The opposition of orthodox practitioners, who had by law to spend at least five years in studying for the practice of their profession, became so acute that there was a suggestion of prohibiting by law the claims advanced by opticians. On the other hand, these latter put forward claims to legalise their position. This was, as it were, the text upon which I advanced views that the University should intervene, and by its action, tend to withdraw the question from that of an unseemly wrangle, into which it seemed to be degenerating. There was, besides, an additional reason why good might be expected to come out of this procedure. It must be understood that, although ophthalmology was considered a very distinct branch of professional activities, there was no Degree or Diploma that would show that the holder had any extensive knowledge of the subject. Such a Diploma in ophthalmology would give the holder the same kind of distinction as the D.P.H. gives to those who are practising public health. I trust to some extent this sort of influence has obtained. No doubt there are, and always will be, abuses of the use of the Diploma, but I do not think they will prevail to any great extent. I think its use will extend, and that the idea of having Oxford as a centre of English ophthalmology will become more and more recognised. This idea struck me very forcibly some years ago, and I did what I could to bring about such a condition, not that I had the arrogance or the assurance to think that it could be accomplished during my Readership; but my attempts were intended to produce such a state of affairs that the event might follow in due course.

When I first came to Oxford in 1884, practically no ophthalmological *clinique* existed. At the County Hospital there were no arrangements which could be considered consistent with such; for instance, there was no dark room devoted to this purpose, no test-types even, and no apparatus, such as is considered necessary. The work was generally in charge of one of the surgeons, who arranged to hand over his "knee cases" to another surgeon, who in return handed over his "eye cases." These eye cases were seen amongst Mr. Morgan's out-patients. He himself, I may be allowed to say, was a peculiarly able man, who, if he had cared to devote himself to such work, could have effectually prevented me from doing more than a tithe of what I had the good fortune to achieve. I am glad to recall that there was never any semblance of bitterness between us, although that was scarcely the case as between our various supporters.

Suffice it to say that the Oxford Eye Hospital was eventually founded chiefly by the munificence of Mr. F. Menteith Ogilvie and his mother. Here, I may mention that Mr. Ogilvie himself became one of the surgeons at the Hospital, a man whose work has always been recognised as being of the highest quality and one who is respected by all who know him, not only in Oxford, but in a far wider sphere. The range of usefulness of the Hospital has become very wide, and, although it is necessarily cramped in some directions, it is hoped that these may gradually disappear. The main object, however, namely, that of treating ophthalmic cases, has been gradually progressive. Yet, although there must necessarily be some scarcity of acute cases, there are advantages in Oxford which cannot be found in more populous centres. Here the clinical record of cases and the keeping in touch with them can be secured to a wonderful extent. This is very difficult even for a matter of six weeks in London, as people do not live permanently in the same district. Very striking instances of records of families in the Oxford district could be given, but I content myself with stating the fact.

The arrangements of the Hospital were made with the advice of the late Sir James Paget, whose son, the late Bishop of Oxford, became Chairman, and afterwards President, of the Hospital. I must not omit to mention that it was the late Sir Henry Acland who in the early stages was the constant supporter and adviser of each new movement. It is well to emphasize that in consequence every step was thoroughly orthodox and carefully thought out. The origin of hospitals seldom receives such careful consideration as in this one. The late Mr. Mason, of Eynsham Hall, Lord Jersey, Dean Liddell, as well as many others, were active supporters.

The Hospital, which was first opened in Jericho, also had out-patient quarters near the present Taylorian Institute, and afterwards in Wellington Square, and was eventually transferred to its present position, where it now occupies what was once a fever block. Originally, the building had but one storey, but it was gradually raised to two storeys. The latest addition, over which there was some discreditable wrangling, was the pathological room. To-day the Hospital is fairly completely equipped, and accommodates nearly forty in-patients, and receives about 2,000 patients annually.

I had hopes, even in my failing health, of developing the pathological side, but it has been impossible for me to do so. I can only hope that those who have some memory of my work in Oxford will make efforts to complete the work I planned.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—ANATOMY AND PHYSIOLOGY.

(1) Hessberg, Richard.—A clinical contribution to the question of excitation of the smooth muscle of the lid. (Klinischer Beitrag zur Reizung der glatten Lidmuskulatur.) *Klin. Monatsbl. f. Augenheilkunde*, October, 1912.

(2) Schneider, E.—The form of the accommodated lens. (La forme du cristallin accommodé.) *Ann. d'Oculistique*, mars, 1914.

(3) Contino.—The presence of glycogen in the tissues of the normal and pathological human eye. (Sulla presenza del glicogeno nei tessuti normali e patologici dell'occhio umano.) *La Clinica Oculistica*, May-June, 1914.

(4) Poppen, A. von.—The experimental deposit of doubly refracting lipoid substances in the eye. (Ueber experimentelle Ablagerung von doppeltbrechender Lipoidsubstanz im Auge.) *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(5) Druault, A. and S.—Researches concerning the later stages of development of the vitreous body and suspensory apparatus of the lens in the slow-worm. (Recherches sur les derniers stades du developpement du corps vitre et de l'appareil suspenseur du cristallin chez l'orvet.) *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(6) Scalinci, Noè.—Intra-ocular fluid and glaucoma. (Liquide endoculaire et glaucome.) *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(1) **Hessberg**, of Essen, reports the following case.—A man, aged 39 years, received a blow on the right eye from the head of a hammer. This resulted in swelling and redness of the lids and conjunctiva. When the eyes were directed downwards, the right upper lid followed only slowly and to a slight degree, and even in forcible efforts at lid closure, the right palpebral fissure remained two or three millimetres wide. There was slight prominence of the right eye, and the right pupil was slightly wider than the left, the reactions of both being normal. Cocaine produced widening of the palpebral fissure, due to retraction both of the upper and of the lower lid. General examination of the patient was practically negative.

In this case, as well as in three or four others with similar symptoms which have been reported, one is apt to think of the possibility that we are dealing with an exophthalmic goitre with unilateral eye symptoms. The author, however, agrees with Sattler in denying that the three lid symptoms of exophthalmic goitre are the result of irritation of the smooth muscle of the lid; and, as he looks upon his case as one of irritation of certain branches of the cervical sympathetic, he does not accept the diagnosis of exophthalmic goitre. A. J. BALLANTYNE.

(2) Some years ago v. Pflugk, of Dresden, studied the accommodative

changes occurring in the eyes of animals by freezing and bisecting eyes under the influence of myotics, and taking photographs of them before they thawed.

Elis Schneider, working in the ophthalmic laboratory at the Rigshospital in Copenhagen, has, on the suggestion of Tscherning, applied this method to the eyes of still-born infants, and now publishes in the article under review a series of illustrations showing the results which he has obtained. These would seem to confirm the theory of Tscherning with regard to the formation of a lenticonus anterior and the shallowing of the anterior chamber during accommodation. R. J. COULTER.

(3) **Contino**, of Rome, has used the methods of Best and Vastarini for the demonstration of the presence of glycogen and has adopted the latter in his investigations, with some slight modifications.

" Systematic research for glycogen in the fœtal eye," says Contino, " shows that this substance can be found in the ocular tissues, after it has already appeared in the head." It is found first in the ridges which preform the lids, in the sulci of the conjunctiva, in the cartilage of the orbital walls, and in the sclera. Later, it is specially abundant in the ectoderm which joins the lid margins, in the primitive lash follicles, in the mesoderm which forms the tarsus, and in the choroid.

Still later, the glycogen abounds in the conjoined edges of the lids, in the choroid, and in the ciliary body ; and much is found between the fibres of the lens.

In the latest stage which Contino examined, glycogen was present in the ganglion layer of the retina, in the protective epithelium of the lids and conjunctiva, and in extraordinary quantity between the fibres and bundles of the ocular muscles. This fact no doubt has a relation to the commencement of muscular irritability. HAROLD GRIMSDALE.

(4) The experiments performed by **Poppen**, of Petrograd, consisted in the over-feeding of rabbits with a diet rich in cholesterine derivatives (*e.g.*, yolk of egg). He found in the choroid an infiltration of doubly-refracting fatty substances, varying in intensity according to the length of the feeding. Earlier researches have shown that, under certain circumstances, doubly-refracting cholesterine derivatives are deposited in human tissues, and that the feeding of rabbits on substances rich in cholesterine leads to the deposition in many of the organs of similar doubly refracting substances. Of especial interest is the finding of these deposits in vessel walls in a manner very suggestive of the changes found in human arterio-sclerosis. Poppen also points out that in some forms of nephritis and diabetes, the metabolic disturbance leads to a cholesterinæmia, and the experiments referred to go to show a direct relationship between this and the deposit in the tissues of doubly-refracting fatty substances.

The investigations are incomplete, and it has to be born in mind that it has not yet been possible to establish an identity between ophthalmoscopic changes and the micro-chemical and microscopic changes in the eye ; but there is enough in the knowledge so far acquired to suggest that the changes of albuminuric retinitis may depend not so much on fatty degeneration of the tissue elements as on the deposition of the products of faulty metabolism in some such forms as those described. A. J. BALLANTYNE.

(5) Former researches by A. Druault in mammals have shown that the suspensory apparatus of the lens and the vitreous body arise as two separate tissues. The former is the first to appear and for a time occupies the whole of the cavity between the lens and the retina. In it is found the hyaloid artery. The vitreous develops relatively late and never contains any vessels.

It originates on the anterior surface of the retina in the form of a thin layer, which increases in volume until it reaches the posterior surface of the lens. In doing so it leaves a space in the axis of the eye between the disc and the posterior pole of the lens—the canal of Cloquet—which is occupied by the remains of the tissue which originally filled the whole of the vitreous cavity. In other words, the growing vitreous displaces this embryonic tissue until it occupies only the canal of Cloquet and the perilental space. To some extent the tissue referred to disappears, and at a later stage it is scarcely recognizable in the central canal of the vitreous, but it forms the fibres of the suspensory ligament of the lens.

The present contribution of **A.** and **S. Druault** is based on a study of the slow-worm (*Anguis fragilis*), in which the anatomical conditions are somewhat different from those in the mammal. But the above view regarding the relationship of the vitreous body and the suspensory apparatus is confirmed. A. J. BALLANTYNE.

(6) **Scalinci**, of Naples, points out that while the tendency of modern research is to show that glaucoma is an ocular manifestation of a general disease, the mechanism of the relationship is not well understood. He insists that we must distinguish between the pathogenesis of irritative and simple glaucoma. In the latter the primary change is an alteration of the ocular tissues concerned with the resorption of the intra-ocular fluid, namely, the iris, the iris vessels, perivascular spaces, and the pectinate ligament. Irritative glaucoma, on the other hand, is readily explained on the vitreous œdema theory. According to Fischer, œdema depends on the tissue colloids possessing an abnormal affinity for water. This in turn is conditioned by increase in the acid content of the tissues, either from excessive production or from defective elimination of acid. Scalinci sees in the acidosis which is so often present in the arthritic subjects of irritative glaucoma the provoker of acute glaucoma. There is, of course, no reason why an eye suffering from simple glaucoma should not assume the signs of the congestive form. A. J. BALLANTYNE.

II.—CELLULAR INCLUSIONS.

(1) **Ferla, J. Addario la.—Upon the signification of certain cellular inclusions observed in the conjunctiva and other mucous membranes in the normal and pathological state. (Sui significato di taluni inclusi cellulari ris contrati in condizioni normali e patologiche, nella congiuntiva ed in altre mucose.)** *Annali di Ottalmologia*, Vol. XLI, fasc. 4, p. 248.

(2) **del Monte, Alberto.—On some singular formations, resembling protozoa, met with in chalazia, and on their probable importance. (Su talune singolari formazioni simili a protozoi rinvenute nel calazio e sulla loro probabile importanza etiologica.)** *Archivio di Ottalmologia*, April, May, and June, 1914.

(3) **del Monte, A.—On certain formations resembling protozoa frequently found in chalazia. (Sur certaines formations semblables à des protozoaires, fréquemment rencontrées dans le chalazion.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(1) The communication of **Addario la Ferla**, of Palermo, is difficult to abstract, and should be read *in extenso* by those interested in the question.

The author concludes that the *soi-disant* "trachoma corpuscles," or "chlamydozoa," are not specific for trachoma, and do not represent the ætiological agents of the disease, inasmuch as they have been found in the conjunctiva infected by gonococci, in other forms of conjunctivitis, and even in the normal conjunctiva. All the hypotheses enunciated by different authors as to the identity in nature between conjunctival blennorrhœa with chlamydozoa and trachoma, mixed infections, on the modifications of gonococci taking the form of chlamydozoa, on the biological differences despite the morphological similitudes, have no basis of foundation, since even the parasitic nature of the cellular inclusions in question is still unproved. The fact that the inclusions can be found in normal mucous membranes (conjunctiva, urethra); their clearly granular aspect, resulting from numerous spherical or oval corpuscles; the presence in the cells containing these inclusions of other granulations of various sizes and of identical colour reactions; and still other considerations, lead us to believe that the chlamydozoa are in reality the result of phenomena of excretion, of degenerative processes in the cell itself, or even representing bacteria existing, not only in the various catarrhal or desquamative affections of mucous membranes, but also in normal mucous membranes in the saprophytic state. In the normal conjunctiva, most of the inclusions, more or less, are due to the secretory activity of the epithelial elements.

Plasma cells, in which trachomatous discharge is so rich, may give rise, when stained by Giemsa, by the extremely fine granulations which make up their granulo-plasm, to the illusion of cells with chlamydozoa.

A. ANTONELLI.

(2) **del Monte**, of Naples, at the end of this long paper draws the following conclusions:—in the altered gland-follicles, never in the healthy, at the centre of typical granulomatous nodules, usually at the periphery of the lesion, we come across certain characteristic forms having the features of protozoa. It is clear from the alteration of the surrounding epithelium, and from the constant presence of giant cells, that the "protozoon" exercises an influence on the tissues. It is not possible, however, to discover the nature of the parasite, beyond the fact that its characters point to an animal, and therefore protozoic, rather than to a vegetable relationship.

HAROLD GRIMSDALE.

(3) The formations described by **del Monte**, of Naples, are found chiefly in chalazia. They are small bodies of varying structure, enclosed in giant cells between the fasciculi of the fibrous capsule or among the cellular elements. They have no resemblance to any cell granules or other tissue elements. For the details of morphology, etc., the original must be consulted. Although the matter still lacks proof, the author inclines to the belief that these bodies are protozoal and are the cause of the disease.

A. J. BALLANTYNE.

III.—VASCULAR AFFECTIONS OF THE EYE.

Jackson, Edward.—Disease of the small blood vessels as studied with the ophthalmoscope, *American Journal of Ophthalmology*, April, 1915. (By courtesy of *Colorado Medicine* (no date given.)

Jackson, of Denver, gives what may be described as a review of this subject prefaced by the remark that it is only possible in the space at his disposal to call attention to the extent of the subject and to its importance. Nevertheless what Jackson has to say makes interesting reading.

The first condition dealt with is vascular spasm. Typical published cases are referred to. Most of the patients presenting this condition have been past middle age, and have shown evidence of arteriosclerosis. One patient of Jackson's, however, was a man in good health and under 30 years old. In this case the eye remained entirely blind until the death of the patient from typhoid fever a year later. Most cases recovered from the single attack, and have subsequently become free from attacks without any clear evidence of benefit from the measures employed. It seems probable that some of the cases of so-called retinal embolism that have been cured by nitrites or massage of the eyeball were really cases of arterial spasm rather than of embolism. The wider interest, says Jackson, of the facts lies in their application to small arteries throughout the body. . . . The phenomenon of migraine points strongly towards similar disturbance of circulation in the visual centres. The presumption is that spasm may occur in any small vessel of the body. . . . The ophthalmoscope has made its contributions to this branch of pathology. A better understanding of the retinal changes may have to wait until similar phenomena have been studied in other parts of the body.

Dealing with permanent obstruction of the retinal circulation, Jackson considers that, while a small minority of these cases is due to embolism, the majority probably arise from thrombosis of the artery starting in points of endarteritis, while closure of the artery is also likely to occur after thrombosis of the central retinal vein. Speaking about the opacity which has generally been referred to as œdema of the retina in such cases, the author holds that there is little positive evidence of the retinal swelling. Hancock suggested that the appearances were better explained by the occurrence of a tissue necrosis affecting the superficial layers of the retina. This view is also held by Coats, and seems more rational than the theory of œdema. The necrosis is confined to the superficial layers. Where these are absent, as in the fovea, no change in the colour of the fundus takes place. It is admitted that the very similar appearance seen in amaurotic family idiocy is due to degenerative changes in these layers ; and similar veiling of the fundus without œdema has attended the toxic alterations in experimental poisoning with methyl alcohol. Primary thrombosis of the retinal vein, which does cause retinal œdema and multiple hæmorrhages, does not cause the peculiar veiling of the central part of eyeground as we see it in arterial obstruction. Partial obstruction of the retinal circulation has a better prognosis. A woman, aged 42 years, with marked evidence of endarteritis, had been given a prognosis of permanent blindness following an attack that may have been partly due to arterial spasm or may have followed a hæmorrhage into the optic nerve sheath. Although her vision was greatly reduced at first, it subsequently rose to 4/4 in a small field, and she retained a useful eye until her death, four years later.

After some remarks on angiosclerosis, aneurism, and angiomatosis (von Hippel's disease), Jackson, speaking of tuberculosis of the retinal vessels, says that both massive exudation and recurring retinal hæmorrhage in young persons have been more and more traced to vascular disease and especially to tuberculosis. Cords has reported a case of retinal periphlebitis which rapidly recovered under tuberculin treatment, and brought together six others probably tuberculous in character. Knapp and also Fleischer have recorded cases pointing in the same direction.

After a few words about syphilis of the retinal vessels, the author speaks about acute infections, due to influenza, puerperal septicæmia, scarlet fever, cerebro-spinal meningitis, etc., and notes that while the majority of such cases are seen only in the late stage, in rare cases the ocular lesions have come under observation early. These cases indicate clearly their vascular origin and the general importance of the blood-vessels in metastasis. In the retina points of vascular obstruction appear, probably starting with minute bacterial emboli, and quickly extending by thrombosis. These points become foci of local infection, rapidly involving all the ocular tissues in the process, which may or may not be suppurative.

In a final paragraph reference is made to retinal hæmorrhage due to pressure at birth, and otherwise.

A bibliography contains 24 references. ERNEST THOMSON.

IV.—REFRACTION.

(1) **Newcomb, John R.—Report on a series of 150 cases of errors of refraction, and a brief analytical consideration of the symptoms presented.** *Ann. of Ophthalmology*, April, 1915.

(2) **Woods, Hiram M. — Routine refraction problems.** *Ann. of Ophthalmology*, April, 1915.

(3) **Wallis, G. F. C.—Ordinary and atypical migraine in their relation to ocular defects.** *Practitioner*, August, 1915, p. 213.

(4) **Ross, T. A.—The ocular troubles of neurasthenia.** *Edinburgh Medical Journal*, August, 1915.

(1) **Newcomb,** of Indianopolis, contributes a paper which gives abundant evidence of painstaking work, and of a desire to lift our dealings with refraction cases on to a scientific basis. The idea that the earlier part of his paper would have otherwise conveyed, is contradicted by the following words "I do not wish to give the impression that I am attempting to establish a symptom group index to errors of refraction, but it does impress me that this analysis has at least indicated that certain mechanical defects of the eye produce certain definite symptoms in a predominating percentage of cases, and that farther study along the same line is warranted." His percentage of cases of mixed astigmatism strikes one as extraordinarily high, *viz.*, 23·6 per cent. of all the patients examined. He comments on this himself, and attributes the figure to improved methods of diagnosis. He finds the depression type of nervous manifestations absent in all but the compound and mixed astigmatisms, and comments on the total absence of nervous irritability and depression in simple myopia. The lower forms of astigmatism are more prolific of nervous manifestations than are the gross errors of refraction. The duty of carefully correcting all errors of refraction in the young is forcibly driven home. The paper closes with a *résumé* of the writer's views on the correct method of refracting. Many will disagree with some of them, but all will accord them respectful consideration. The paper is one which well repays careful perusal, and the more so as it deals with a subject which interests us all, and which by its very commonness we are apt to think beneath scientific study. R. H. ELLIOT.

(2) **Woods,** of Baltimore, discusses three "refraction problems," *viz.*, (1) the uncertainty regarding completeness of cycloplegia and its meaning;

(2) the therapeutic uses of cycloplegic drugs, apart from their function of disclosing a latent error of refraction; and (3) the correct interpretation of muscular imbalance, with special reference to (*a*) its bearing on the correction of ametropia, (*b*) the treatment of certain forms of heterophoria at the reading distance, (*c*) Nature's ability to counteract imbalance, and (*d*) the use of prism exercises.

The communication is both thoughtful and interesting, but its value is lessened by the difficulty experienced in understanding the writer's precise meaning, owing to the obscurity of his diction. If Hiram Woods would re-write his communication, expanding it, and simplifying and shortening his sentences, he would bring his meaning within the reach of those of us who at present find it hard to follow him.

Were his contribution one of less merit, the suggestion would not be made. R. H. ELLIOT.

(3) It can scarcely be too widely known among practitioners of medicine that in rare cases ordinary migraine may be replaced by periodic vomiting or by vertigo, symptoms which, like migraine itself, may not infrequently be relieved by the provision of suitable glasses. **Wallis** describes two such cases, one in a lad of 11 years, where the condition presented a close resemblance to so-called cyclical vomiting, and the other in a girl of 19 years, where the headache was replaced by nausea, momentary giddiness, and slight vomiting. Both of these patients obtained relief from glasses.

SYDNEY STEPHENSON.

(4) **Ross,** of Ventnor, I.W., publishes a thoughful article upon the eye troubles of the neurasthenic. He is not one of those who believe that general nervous symptoms may be due to low degrees of astigmatism. Such are common to us all, and he refuses to believe that a thing which is normal can produce the most distressing set of symptoms to which the body is liable. There must be some other factor, and that he finds in mental depression. When that has been removed by explanation of the true circumstances (*sic*!) of the case, the patient will be cured. But any error of refraction should be corrected, and if the condition be one of neurasthenic asthenopia, the patient should be warned that if he is worried or depressed, there will be a temporary return of the symptoms. There is truth in the author's remark, namely, that "the important point is not what the oculist prescribes, but how he examines and what he says. If he is a man who uses a cycloplegic and an astigmometer, and who is enthusiastic about corrections in 1/8 of a dioptre, he will get some cures. Such an examiner . . . will give the patient the feeling that he has been well examined, and the tendency to cure will be enhanced."

SYDNEY STEPHENSON.

V.—LYMPHOID INFILTRATION OF THE ORBIT.

Coats, George.—Discrete lymphoid infiltration of the orbit. *Archives of Ophthalmology*, Vol. XLIV, No. 3, May, 1915.

The following is a summary of the case as presented by **Coats**, of London:—

Proptosis of right eye, forwards and slightly upwards and outwards, of ten months' duration, in a man, aged 37 years. Movements practically full. Firm resistance to backward pressure. Some enlargement of retinal veins, and blurring of disc. Vision (with correction) practically full. Orbit exenterated. Seven years later, same thing commenced on left side. Patient's health perfect throughout. Physical examination revealed nothing abnormal. Blood examination negative.

Pathologically.—Orbital tissues strewn with numerous isolated nodules of lymphoid tissue, situate chiefly in the fibrous trabeculæ, along the larger vessels. These nodules are composed not only of lymphocytes, but also of fully developed lymph-follicles. No special concentration of the changes in the vicinity of fornix or of lacrymal gland. No micro-organisms demonstrable.

The only other cases known to Coats which present any real resemblance to the above are two recorded by Birch-Hirschfeld ; notes of these are given.

A classification of the lymphomatoses follows, and their relation to each other and to the inflammation is discussed, leading to the somewhat discouraging conclusion that we are not yet in a position to be dogmatic on the subject. As regards local ocular manifestations of lymphomatoses, most symmetrical tumours of the eyelids and orbits belong to this group. The tumours are commonly multiple, and situated in the lids ; they rarely invade the orbit deeply ; they usually appear simultaneously with enlargement of lymph glands, etc., elsewhere, and with other signs of a constitutional affection. As to the derivation of the lymphomata, the probabilities seem in favour of their origin from pre-existing cells of the tissues, the condition being a local expression of a general over-activity of the lymphopoietic apparatus. In the present case the condition has closer affinities with the inflammations than with the neoplasms. Its bilateral incidence points to some dyscrasia, but no evidence of such is forthcoming.

The above is a bare outline of an instructive paper, which should be read in the original by all who are interested. R. H. ELLIOT.

VI.—CYSTS IN THE ANTERIOR CHAMBER.

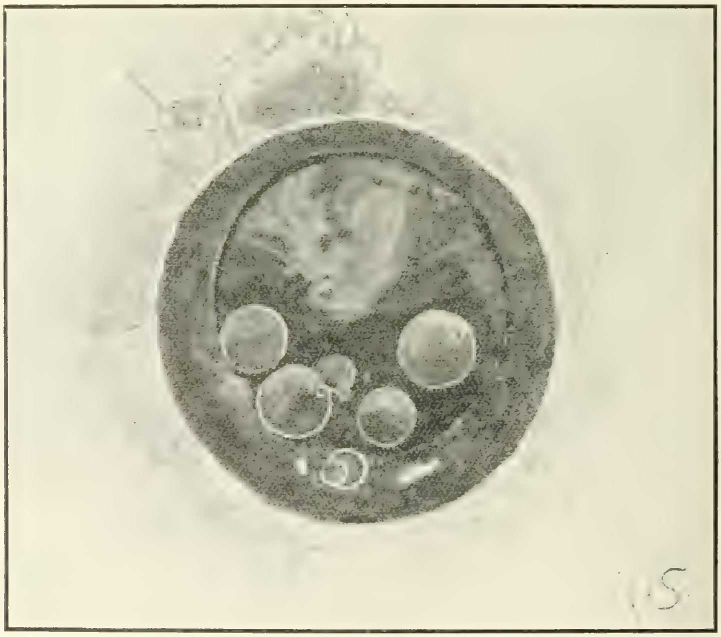
Spicer, W. T. Holmes, and Greeves, R. Affleck.—Multiple cysts in the anterior chamber derived from a congenital cystic growth of the ciliary epithelium. *Proceedings Royal Society of Medicine : Section of Ophthalmology*, December, 1914, p. 9.

A baby of sixteen months showed some bulging of the lower part of one iris, together with three solid-looking, finger-like projections, of buff colour, peeping from behind the lower edge of the iris, and an opacity of the lower segment of the lens. **Spicer**, of London, being unfamiliar with the condition, showed it to several of his colleagues at the Moorfields Hospital. Opinions varied, and although tubercle and glioma were mentioned, a majority thought that there was no need for removal of the eye.

Some four years later (1911), the buff-coloured projections had been replaced by a broad posterior synechia, and the lens had become generally opaque. A grey translucent globule, apparently devoid of structure, was found floating free in the aqueous humour. By the end of 1912, there were three similar bladders floating untethered in the anterior chamber. The sclera, just above and outside the cornea, was beginning to show signs of attenuation. In the summer of 1914—that is, when the child was about nine years of age—the patient was brought to hospital, because the eye had given pain for some months. The condition was as follows.--There was a definite scleral staphyloma above the cornea, along with discolouration of the entire extent of the ciliary region. The pupil was dilated, and the tension raised. The deep anterior chamber presented a curious appearance (see figure). It contained seven transparent cysts floating free in the aqueous humour. The largest was about 3mm. in diameter. On movements of the eye, most of these bodies rebounded from each other and from the walls of the anterior chamber just like so many toy balloons. One of the cysts (shown in the figure) appeared to be budding in two places. A couple of opaque white masses, which lay on the lower part of the iris, resembled collapsed cysts.

The eye was removed in October, 1914, and handed over to **R. A. Greeves,** of London, for pathological examination and report. The last-named runs to twelve pages of the *Proceedings*, and so it is possible here to give only its more important points.

Besides a scleral staphyloma in the upper and outer part of the ciliary region, and signs of secondary glaucoma, cysts were present in the anterior part of the vitreous, the anterior chamber, between iris and lens capsule, and attached to the region of the root of the iris and ciliary processes around the whole circumference.



Ciliary staphyloma above. Seven cysts floating in the anterior chamber, one having apparently two daughter cysts growing from it. Remains of other cysts (?) lying on the iris.

The walls of free cysts from the vitreous and anterior chamber were made up of structures that bore a striking likeness to the retina at about the sixth or seventh week of fœtal life. Many of the cysts contained a fibrillar structure, closely resembling the normal vitreous in structure, and more or less filling the cavity. Another species of cyst, not numerous and found in the region of the ciliary staphyloma, had no vitreous-like contents, and presented the further peculiarity, that the limiting membrane was found lining the lumen instead of surrounding the outside of the cyst.

Sections through the entire globe showed the primary condition to be one of a new growth derived from the unpigmented layer of the epithelium of the ciliary body. The growth itself imitated in structure the embryonic retina, and included numerous "rosettes," but continuous with it were cellular membranes, which lined the lens capsule and branched among the anterior fibres of the vitreous, and numerous cystic bodies, some of which were attached to the cellular membranes, while others, as we have already seen, floated free in the anterior chamber and vitreous. In the author's words, "it seems impossible to call the growth anything but an embryonic retinal new growth of the unpigmented ciliary epithelium."

Greeves claims that the case is unique clinically, while as regards its main pathological features, it is the fifth of its kind on record. These curious cases have so far been met with only in children under nine years of age, and in each the eye became glaucomatous and developed a ciliary staphyloma. They were classed among malignant tumours by Fuchs (*Arch. f. Ophthal.*, Vol. LXVIII, 1908, p. 534) because in each instance there was a neoplastic invasion of the sclera. But the rate of growth was always slow, and no other evidence of malignancy was present. One peculiar feature of the present case is that although the growth originated in the upper part of the globe, the first clinical evidence of its existence was seen below. Greeves explains this circumstance by supposing that the growth spread downwards and then sprouted from behind the lower margin of the iris. Finally, the present case, as compared with others presents two outstanding differences:—(1). Many fully developed cysts became detached from the parent growth, and appeared to the naked-eye as free bodies in the anterior chamber; and (2). No blood-vessels were found in the present case, a particular in which the growth differs markedly from a glioma of the pars optica retinæ.

SYDNEY STEPHENSON.

VII.—INJURIES TO THE EYE IN WARFARE.

(1) **Cosmettatos.—On wounds of the eyes during the recent Greco Turkish and Greco-Bulgarian wars. (Les blessures des yeux pendant les deux dernières guerres Gréco-Turque et Gréco-Bulgare.)** *Ann. d'Oculistique*, août, 1914.

(2) **Valude, E.—On inopportune operations on the wounded in war (Des opérations inopportunes sur les blessés de guerre.** *Ann. d'Oculistique*, novembre, 1914.

(3) **Morax, V.—Cataract operations on wounded soldiers. (L'opération de la cataract chez les blessés militaires.)** *Ann. d'Oculistique*, novembre, 1914.

(4) **F. de Lapersonne.—Orbito-ocular injuries in war. (Blessures de guerre orbito-ocular.)** *Archives d'Ophtalmologie*, janvier-février, 1915.

(5) **Jousset, Xavier.—Ophthalmology at the Front.** *Medical Press and Circular*, April 21st, 1915.

(6) **Roll, G. Winfield.—Bullet wound of orbit.** *Royal Society of Medicine: Section of Ophthalmology*, April, 1915, p. 94.

(7) **Evans, J. Jameson.—Some experiences of ocular troubles in soldiers.** *Midland Medical Journal*, June, 1915.

(8) **Milner, C. E. H.—Two cases of traumatic double hemianopia with partial recovery.** *Lancet*, July 24th, 1915.

(9) **Ormond, A. W.**—Injuries to the eye in warfare. *Ophthalmic Review*, August, 1915.

(10) **Moore, A. Eisdell.**—Temporary blindness from a penetrating bullet wound of the occipital lobe. *Lancet*, August 21st, 1915.

(11) **Discussion on Ophthalmic Injuries in Warfare.** *Trans. Ophthal. Society U.K.*, Vol. XXXV, 1915, pp. 1-68.

(1) **Cosmettatos,** of Athens, gives an account of the ophthalmic cases under his care in the base hospitals at Previsa and Salonika during the recent wars between Greece and Turkey, and between Greece and Bulgaria. In all, 13,635 wounded were treated in the hospitals to which the author was attached, and of these, 118 (or 0·85 per cent.) suffered from ocular injuries. These were caused as follows:—

By bullets from rifles and machine guns ...	43 cases
By fragments of shell	29 cases
By pieces of stone	35 cases
By shrapnel bullets	4 cases
By pieces of wood	4 cases
By dynamite	3 cases

The wounds caused by rifle bullets were almost always aseptic, but fragments of shell produced, as a rule, large losses of substance with infection. The injuries with stone and wood were caused by fragments thrown up by bursting shells.

Among these 118 cases, there were 29 of complete destruction of an eye, 17 of total loss of vision in an eye, 22 of partial permanent and 13 of partial temporary loss of vision.

The wounds were simple (*i.e.*, involved only one structure in the eye) in 42 cases, and complex in 76. The simple cases were distributed as follows:

Injuries of conjunctiva	9
cornea...	14
iris and ciliary body...	2
lens	1
eyelids	16

There were 29 cases of complete destruction of the left eye and 10 of the right. Of these 29 cases, 12 were accompanied by fracture of the orbit. Apart from these there was total loss of vision in 35 eyes and partial loss of vision in 17 eyes. The distribution of the lesions in these cases is shown in the following table:—

	Total loss of vision, 17 cases.		Partial loss of vision, 35 cases.		
	Immediate, 13 cases.	Late, 4 cases.	Immediate, 32 cases.		Late, 3 cases.
Injury of—			Temporary, 13.	Permanent, 19 cures.	Permanent,
Cornea ...	4	2	8	12	1
Sclerotic ...	0	0	1	0	0
Iris and ciliary body ...	1	1	0	1	1
Lens ...	0	1	1	0	1
Vitreous ...	4	0	2	0	0
Choroid ...	0	0	0	1	0
Optic nerve ...	4	0	1	2	0
Retina ...	0	0	0	1	0
Visual centres	0	0	0	2	0

There was one death from septic meningitis, following an orbital abscess caused by a shell wound.

There was no case of tetanus. Injections of anti-tetanic serum were given in all cases of injury with stones or wood.

The article which consists of statistics and brief descriptions of the injuries in some of the cases does not lend itself to further condensation.

R. J. COULTER.

(2 and 3) **Valude** and **Morax**, of Paris, hold different opinions as to whether a unilateral traumatic cataract due to a war wound should be removed in a military hospital.

Valude considers that the patient should be discharged from the service (*réformé*) or transferred to the auxiliary forces without operation for the following reasons:—1. No matter how successful an operation might be it could not make the patient fit to return to the firing line; 2. It is to the patient's interest to postpone interference until the risk of post-operative cyclitis is reduced to a minimum; and 3. It is to the interest of the State not to run the risk of having the pension payable to the man increased owing to post-operative cyclitis or even sympathetic inflammation. Immediate interference would, of course, be indicated by complications such as the occurrence of secondary glaucoma or the presence of a foreign body.

Morax, on the other hand, does not admit that every soldier suffering from a traumatic cataract should be discharged from the service. He allows that a man with a cataract in the right eye is not fit to serve in the ranks, as it would interfere with his shooting, but states that he knows of cases in which men who have had cataracts removed from their left eyes returned to the firing line. He considers that the cataract should be removed because the operation restores sufficient sight to the eye to prevent the visual field for orientation being limited in a troublesome manner. He considers that an eye with a cataract diffusing light is more disturbing to the sight than an aphakic eye without a correcting lens or even than a lost eye. In the case of officers, the visual requirements are different, and he knows of a number who have remained in the service after losing the sight of an eye. The author cannot see that the risk of operating on these cases would be reduced by undue postponement and doubts whether the liability of the State would be diminished by the return of the patient to civil life, but in any case he holds that it is our duty to repair as far as possible the injuries suffered by our soldiers without limiting ourselves in the application of a treatment by considerations as to whether or not the wounded will be rendered fit for service in the army or auxiliary forces. His own practice is to operate whenever interference is not definitely contra-indicated. R. J. COULTER.

(4) Some interesting points are to be found in this article by **de Lapersonne,** of Paris, which is based on the observation of 80 cases of wounds of the orbito-ocular region received during the present war.

Mainly, however, his experience is probably that of others who have the care of these cases and is very much what might be expected, although there is some difference from preconceived ideas on account of, in the author's opinion, the higher projectile force and the greater variety of projectiles.

Broadly, it may be stated that the injury produced varies with the force and nature of the projectile and the direction it takes.

Types of projectiles are divided into four classes:—

1. Cylindro-conical bullets, slender and with high velocity.
2. Shrapnel bullets of low velocity.
3. Fragments of shell of varying velocity according to the range.

4. A variety of foreign bodies such as powder, fragments of iron, copper, earth, bits of glass, clothing, etc., due to the explosion of shells or grenades.

The direction of the projectile may be from before, back, or transversely. In the former, a foreign body, after doing more or less damage to the eye, may pass on through the orbit and its walls to enter the cranium, although not always producing a mortal wound. Transverse wounds are placed in a special class on account of their gravity ; 15 of the author's cases were of this nature, and 7 of these were followed by complete blindness.

A variety of structures are mentioned which may become injured, but it is sufficient to say that the lesion varies with the line of the projectile. The value of radiography is, of course, pointed out

Chenu's statistics of the Crimean and Franco-Prussian wars are referred to ; they give for bullet-wounds, eyes saved 25% to 35%, and eyes lost 50% to 60%, whilst for shell-fragments, eyes saved 60% to 70%, and eyes lost 35% to 45%. de Lapersonne's results so far give 41% of saved eyes in shell-wounds, destruction of one or both eyes 59%, and even when an eye was saved the vision was not always complete. For bullet-wounds enough cases have not yet been observed.

No cases have yet been seen by the author of that interesting condition described as "commotion" effects, although he agrees that it undoubtedly exists.

Cases of temporary amblyopia with photophobia, lacrimation, and blepharospasm, are fairly frequent in his experience ; they are allied to the hystero-traumatic cases of civil life, and, as a rule, rapidly clear up.

An interesting point brought forward is that under the effect of "commotion" the slightest injuries such as are produced by foreign bodies on the cornea or conjunctiva may be followed by grave consequences, notwithstanding the strictest antiseptic care. This is similar to what has been found in mine explosions, and the author has previously published cases where severe irido-cyclitis has followed superficial wounds of the eye under these conditions. Penetrating wounds of the eye are frequently complicated by traumatic cataract, extraction of which is likely to be followed by serious plastic irido-cyclitis.

When a foreign body complicates such cases enucleation is necessary, and although the magnet may be tried when the foreign body is magnetic, it is much less likely to be successful than in industrial cases.

The author has enucleated 30 eyes of the 80 cases, all of which had done well with one exception, which was fatal.

A curious case is mentioned in which fine spicules of bone had entered the globe from the orbital margin which had been pulverised ; others were interesting from the situation of the foreign body, for example, close to the sphenoidal sinus, etc.

The treatment described is based upon general principles. The importance of complete rest for the first few days is insisted on in all cases, with an early administration of anti-tetanic serum, even in the apparently trivial injuries. Peroxide of hydrogen, permanganate of potassium, and iodoform (in powder or ointment form) are the antiseptics mentioned. For the conjunctival sac a solution of physiological salt is used.

As to operative procedures, the author advises against suturing a much lacerated lid, and for corneal wounds, he has found a conjunctival flap of considerable service.

Regarding sympathetic ophthalmia, the author is certain that grave cases of this nature are much less frequent in this than in previous wars, some statistics of which are quoted (War of Secession and Franco-Prussian), but he draws attention to a mild (*atténuée*) type of the disease of which, he says, there are rather a large number of cases. The symptoms are not at the onset alarming but are none the less very serious from the visual point of view.

Enucleation should not be performed in field hospitals or clearing stations, but should await the patient's admittance to the base hospital. The seven or eight days, earlier than which no case of sympathetic has been reported, give ample time for his transference thither. BERNARD CRIDLAND.

(5) **Jousset,** of Paris, after two months' experience in an ambulance, stationed some ten miles from the fighting line, where wounded are received within a few hours after the receipt of injury, states the following aphorisms :

1. The very large proportion of wounds of the eye during the present war.
2. The importance of conveying the wounded, after a preliminary dressing on the field, to an ambulance sufficiently near the front to allow of necessary interventions, that is to say, not more than ten or fifteen miles from the line of fire.
3. All wounds in warfare must be looked upon as septic and treated antiseptically, all operative measures being aseptic.
4. The advantages of eviseration of the globe over enucleation
5. The satisfactory results of suturing wounds of the face.
6. The desirability of sending patients as promptly as possible to an ophthalmic centre accompanied by a detailed note of the lesions and the treatment. SYDNEY STEPHENSON.

(6) **Roll,** of London, reports an instance of indirect gunshot injury of the right eye. The bullet entered on a level with the floor of the right orbit, and emerged close to the tragus of the corresponding ear. R. V. = 6/36. At the centre of the macula was a circular opening, about half the size of a papilla. The floor of the aperture was uniformly red and showed faint mottling. SYDNEY STEPHENSON.

(7) **Evans,** drawing from his experience since the beginning of the war at the Birmingham and Midland Eye Hospital, divides eye cases in soldiers into two groups, as follows :—1. Ordinary diseases of the eye in soldiers not arising directly out of their military duties ; and 2. diseases and injuries due to the soldiers' occupation. As to the first group, nothing need be said except to draw attention to the circumstance that diseased lacrymal sacs formed 10 per cent. of all soldiers admitted to the Hospital as in-patients. As to the second group, it may be noted that no single case of sympathetic ophthalmitis has so far fallen under notice. A couple of cases have been met with where "holes in the macula" arose as a sequel to the ill-defined blows on the eye or its neighbourhood. No cases of "shell shock" have been seen, although an instance of one-sided optic atrophy, resulting from the concussion of a shell explosion close to the patient, is mentioned. Homonymous hemianopia, partial or complete, has been seen following a blow or fall or wound of the occipital region. The author comments upon the cases where the exigencies of a military life appear to be responsible for converting latent defects of the eye, as hyperopia or hyperphoria, into active and disabling defects. Malingering, or the exaggeration of symptoms, in Evans' experience, has been all too common during the war.

SYDNEY STEPHENSON.

(8) **Milner,** R.A.M.C. (T.), reports the cases of two soldiers who suffered from almost identical injuries and had practically identical symptoms. The injuries were due to bullet impact in the occipital region. Details may be

sought in the original. The symptoms were, at first, complete blindness (double hemianopsia), followed by recovery of vision of the whole field, except the left lower quadrant. At the time of examination by Milner, the visual field showed the quadrantic defect in both cases and the restriction of the visual field was the only abnormality present in the nervous system.

The author, in speculating regarding the ætiology, holds it certain that an actual damage was done to the lower part of the cuneus on the mesial surface of the right occipital lobe. This would account for the persistent quadrantic hemianopia. Regarding the transient double complete hemianopsia, there are, he thinks, two possible solutions. On the one hand, it may have been caused by hæmorrhage at the moment of the wound along the mesial aspect of the occipital lobes. On the other hand, it may be due, as suggested by Major F. W. Mott, R.A.M.C. (T.), to a profound but passing shock effect which made itself felt also in the opposite occipital lobe, and for the time being paralysed the function of the entire visuo-sensory apparatus.

ERNEST THOMSON.

(9) This comprehensive communication by **Ormond**, of London, is based upon nearly 1,000 cases seen during the last eight months among men who have either returned from the fighting line or who are training to go there.

The facts of three cases of traumatic amblyopia following the explosion of shells are detailed. The curious case of a Territorial whose life was probably saved by his glasses is worth more than a word of passing mention. The facts as given by Ormond are as follows.—" On January 2nd at Armentières, he was standing talking in the trenches when a bullet, travelling from right to left, struck the left lens of his glasses, splintering the glass and grazing the skin of his face beyond the external canthus. The outer half of his left cornea had numerous scars, the result of the broken glass, and the mark on the skin could be distinctly seen. Had he not been wearing glasses the bullet must have entered his orbit and would probably have passed backwards to the brain."

The paucity or absence of sympathetic ophthalmitis during the present war has commented upon by Jessop (THE OPHTHALMOSCOPE, May, 1915, p. 248), who had neither seen nor heard of a single instance. Ormond, however, mentions such a case.—A Belgian soldier had lost the sight of one eye, owing to a bullet having passed through the orbit, and although there was no evidence of any damage to the sclera, there was considerable disorganisation of the interior of the eye. Several weeks later he was seen by Arthur B. Zorab, of Southampton, on account of mistiness in the other eye, the sight of which was 6/9. There was slight vitreous haze and circumcorneal injection. The man undoubtedly suffered from sympathetic trouble. The first eye was removed, and a small punctured wound of the sclera, close to the optic nerve, was found, with a small bead of pus in connection with it. Zorab thought that the condition was due to a splinter of bone having penetrated the sclera.

Speaking of foreign bodies, injuries from which are very common, Ormond makes the following statement :—" If there should be any question at all of the presence of a foreign body, I would not rely solely on the finding of the X-ray examination, because in several of my cases the foreign body was not discovered until a second or third photograph had been taken and sometimes not even then. I think that the history, the nature of the inflammation, as well as the amount of vision present, should be considered when one is making one's decision, and it is quite probable that during the next twelve months a large proportion of cases of sympathetic ophthalmia will be seen."

Ormond has met with one case only in which detachment of the retina was probably present.

Although the author has seen only one instance of deliberate malingering, yet he notes that many men are inclined to exaggerate existing defects and "require some reassuring that matters are not as serious as they would like one to believe."

An interesting communication concludes with a tabulated list of twenty-eight cases of soldiers blinded during the present war, 1914-15.

SYDNEY STEPHENSON.

(10) The case reported by **A. E. Moore** (R.A.M.C.), supports the view (now becoming more general) that in many cases of gunshot wound of the head, it is wise to delay operative measures.

On June 18th, 1915, a soldier was hit in the head by a bullet, and immediately blinded. Two days later, when seen by Moore, he could not tell night from day, and his pulse-rate was very slow. X-ray photographs showed that the bullet had passed through both occipital lobes, entering just below the left lateral sinus, and emerging from the upper part of the right lateral lobe. Four days after the injury, the man had perception of light; on the tenth day he could count fingers; and on the fifteenth day he could read ordinary print, but there was some limitation in the right field of vision, as roughly tested. The sight and the fields of vision, both for white and for colours, were apparently normal on the twenty-second day, when he was transferred to England. The pulse-rate showed a corresponding acceleration from 44 per minute on admission to 84 on discharge from the base hospital. It is not a little curious that a bullet could pass through both occipital lobes without causing permanent interference with sight. We can only conclude that the temporary blindness was due in the main to concussion.

SYDNEY STEPHENSON.

(11) An important discussion upon "Ophthalmic Injuries in Warfare" was held by the Ophthalmological Society of the United Kingdom in April last. It was opened by **W. H. H. Jessop** and **W. T. Lister,** and their respective communications have already been abstracted in the pages of THE OPHTHALMOSCOPE (May, 1915, p. 247).

The recent publication of the *Transactions* of the Society now allows of an abstract of the remarks of those who took part in the discussion.

After some remarks from **Landolt**, of Paris, **de Lapersonne**, also of Paris, alluded to (1) hemianopic scotoma following a bullet wound of the occipito-parietal region a little to the left of the median line; (2) inferior quadrantal hemianopia after a bullet had passed through the posterior portion of the skull from the left occipital region to the right parietal region; and (3) a case of paralysis of the right sympathetic due to a lesion of the rami communicantes, where recovery followed removal of the bullet and laminectomy of the sixth cervical vertebra.

Adams, whose experience had been obtained at the Third Southern General Hospital, Oxford, recounted several cases of injury by bullets, shells, and so forth, including one where a man was shot through from temple to temple. The sole symptom found was a "hole" at the macula of the left eye, with a corresponding small central scotoma. Adams draws attention to the effect of shell explosion and the constant strain of the trenches upon the hyperopic eye. These factors tend to render the error totally manifest, so that even small amounts, as 0·5 D., disorder sight, while higher ones tend to incapacitate the individual. Hyperopes, too, may complain that their shooting is impaired. It was always the same story, 'the longer they aim, the worse they shoot.'

Pooley, of Sheffield, speaking of the trivial cases, says that one man came all the way back from France because he had broken his glasses, which were for one-quarter of a dioptre of astigmatism only. When an eye has been destroyed from the penetration of large fragments of metal, a class of case seen in Sheffield, Pooley turns down a conjunctival flap nearly as far as the insertion of the ocular tendons, and divides the sclera just behind the ciliary body, and thereby removes the cornea, iris, ciliary body, lens, etc. All traces of choroid and retina are then scraped away. By these means Tenon's capsule is not opened. An operation based upon the same principle was described by W. T. Lister in the opening communication (*see* THE OPHTHALMOSCOPE, May, 1915, p. 248). Two cases of head injury, followed by homonymous hemianopia in the one, and by symmetrical loss of the lower part of each field in the other, are mentioned by Pooley. In "shell fright" he had found that the pupillary reactions were normal.

Mackay, of Edinburgh, related an instance of a remarkable escape from serious damage following a bullet lodged partly in the left frontal sinus and partly in the orbit. A month after the injury, the shrapnel bullet was removed by Sidney Boyd, at the Military Hospital, Tidworth. When seen by Mackay, two months after the operation, the patient complained merely of diplopia, mainly due to damage to the left superior rectus muscle.

R. R. Cruise, of London, related a couple of cases where by the employment of Sir Mackenzie Davidson's telephone appliance, he succeeded in removing foreign bodies from the orbit. So far, he has not tried this ingenious appliance (fully described by the inventor in the present issue of THE OPHTHALMOSCOPE) for foreign bodies embedded in the eyeball. Cruise mentions two instances of quadrantic defects in the visual fields, following penetrating injuries of the posterior part of the skull. Finally, the speaker mentioned cured cases of miners' nystagmus, and enquires whether they should be debarred from military service.

L. V. Cargill, of London, compared, in an interesting and instructive way, his experiences in the South African war with those obtained during the present campaign. One striking difference lies in the great preponderance of ophthalmic injuries in the present war, owing to the type of trench and siege warfare In Africa most of the eye injuries were from bullets, and in this war from shell fire. The Mauser bullets in South Africa made much cleaner wounds of entry and exit, and did less relative damage to the parts than did the pointed German bullets of lower trajectory. The former did not show the septic tendency of the present-day German missile. The greater severity of wounds from the German bullet is also due to the shorter range (200 yards or less) at which they are fired. In South Africa Cargill met with no instances of shell shock or traumatic neurosis with amblyopia. He paid a tribute to Sir J. Mackenzie Davidson's cross-thread method of localising foreign bodies.

A. W. Ormond, of London, has published his remarks elsewhere, and they are abstracted above (see No. 9).

Frank Thomas, of Swansea, spoke of the difficulty of distinguishing between sufferers from concussion of the retina, on the one hand, and malingerers, on the other. He believed that the subjects of miners' nystagmus "were absolutely useless for soldiering."

T. H. Townsend, of Cork, suggested that those with miners' nystagmus need not be shots, since they "were found to be useless for getting on to the target." They might be allowed to join the sixty-seven men in each regiment detailed to do "donkey work." By these means their services would not be lost to the Army altogether.

A. L. Whitehead, of Leeds, believed that if nystagmus could be brought out in men, as by making them stoop and look upwards, they were not fit for active service in the firing-line. They were fit for home service only. He had seen spasm of accommodation after the explosion of a shell near to the patient.

Priestley Smith, of Birmingham, exhibited a Nélaton probe, which he had himself employed when working as a surgical assistant among wounded in the Franco-German War.

A. Greene, of Norwich, devoted his remarks to concussion amblyopia, injuries by richochet and the importance of examination by X-rays.

R. H. Elliot, of London, was reluctant to accuse a soldier of feigning disease. He felt it better, if need be, that twenty men should be dismissed from the Army rather than a slur should be cast upon one good man.

Gray Clegg, of Manchester, thought that microscopic retinal changes might account for some of the cases now regarded as traumatic neurasthenia.

F. Richardson Cross, of Clifton, Bristol, suggested that men who had faulty right eyes, but who could see well with the left, might be grouped and made into a left-handed squad. He discussed the causation of the various kinds of hemianopsia. He had received a message from the Director-General of the Army Medical Corps to the effect, "don't send us any cases of nystagmus." In action it was found that they might not only shoot badly, but to one side, and thus damage their comrades instead of the enemy.

SYDNEY STEPHENSON.

VIII.—THE ACCESSORY SINUSES.

(1) **Gallemaerts.—Mucocele of the frontal sinus. (Mucocèle du sinus frontal.)** *Société Belge d'Ophtalmologie*, 28 avril, 1912.

(2) **McCubbin, J. B. and Gundelach, C. Armin.—A case of optic papillœdema and paresis of the third nerve caused by inflammation of the ethmoidal sinuses.** *American Journal of Ophthalmology*, May, 1912.

(3) **Pooley, G. H. and Wilkinson, G. (Sheffield).—A case of temporary total blindness of the left eye due to pressure of cystic distension of the left maxillary antrum on the optic nerve. Rapid recovery of sight after operation.** *Ophthalmic Review*, May, 1913.

(4) **Harris, C. M.—An unusual complicated case of sphenoidal abscess causing amblyopia.** *Ophthalmic Record*, March, 1914.

(5) **Hambresin.—Mucocele of the frontal sinus. (La mucocèle du sinus frontal.)** *La Presse Médicale Belge*, 19 avril, 1914.

(6) **Ewing, A. E., and Sluder, Greenfield.—Abducens palsy following nasal trauma and nasal infection.** *American Journal of Ophthalmology*, December, 1914.

(7) **Bradburne, A. Alison.—A case of bilateral optic neuritis due to sphenoidal sinusitis presenting several features of interest.** *Medical Press and Circular*, December 30th, 1914, and *British Medical Journal*, January 16th, 1915.

(8) **Shahan, William E.—Optic neuritis of nasal origin.** *American Journal of Ophthalmology*, March, 1915.

(1) In the patient shown by **Gallemaerts**, of Brussels, the tumour had been developing for three years, and had projected the anterior table of the frontal, and at the same time had opened the inferior wall of the sinus and had penetrated into the orbit. Puncture gave exit to a ropy-brownish fluid.
MARCEL DANIS.

(2) Fortunately, the main facts of the extraordinary case reported by **McCubbin** and **Gundelach**, of St. Louis, are epitomised in the title, for no abstract could possibly do justice to the maze of symptoms and troubles of the patient or to the remedial measures employed. ERNEST THOMSON.

(3) The patient noticed a mistiness of the left eye increasing from below up, and in five days had lost perception of light; direct pupil action was lost and there were no changes in the fundus. On transillumination, the left antrum was found to be slightly less translucent. Two drachms of fluid were removed on tapping, and half an hour later hand-movements could be seen. The antrum was therefore opened through the canine fossa and a thin-walled cyst, containing polypi, removed; the posterior part of the orbital wall was found to bulge upwards; the antral ostium was closed. The cyst and polypi were covered with a thin layer of ciliated epithelium. Twelve days after the operation, the vision had recovered to 6/9 most, and a fortnight later, 6/6 and Jaeger 1, with a full field. The cyst was a degeneration cyst in a mucous polypus. A. H. PAYAN DAWNAY.

(4) The case by **Harris**, of Johnston, Pa., was that of a man, aged 59 years, whose left vision had been failing for five weeks, and on examination, was found to be reduced to 6/22. The fundus showed nothing beyond a hazy disc and abnormally dark retinal veins. Finer tests for central scotoma and definition of the blind spot were not applied. Pronounced deflection of the septum nasi with polypi were found on the left side. A few days after removal of the polypi, vision improved to 6/12, but relapsed again in three weeks to 6/15, and this did not improve after the purulent contents of the sphenoidal sinus were cleared out by compressed air and irrigation. The septum nasi, the left middle turbinate, and the underlying ethmoid were then resected, and the anterior wall of the sphenoidal sinus was broken down and its polypoidal contents were curretted, and still vision remained at 6/15, although the fundus regained a normal appearance.
J. JAMESON EVANS.

(5) **Hambresin** reports a case of mucocele in a man of 61 years, who presented the following symptoms:—narrowing of the palpebral fissure, deviation of the eye down and out, swelling of the supero-internal angle to the size of a nut. The last-named tumour was not adherent to the skin, and was of a fluctuating character. The movements of the eyeball were limited upwards and inwards. Puncture of the swelling caused the escape of an alkaline opalescent ropy fluid, containing numerous fatty globules and crystals of cholesterin. The puncture brought about a temporary cure.
MARCEL DANIS.

(6) The article by **Ewing** and **Sluder**, of St. Louis, seems to be of such interest as to warrant an amount of transcription only to be styled an "abstract" by courtesy.

Ewing says.—"A case presenting direct evidence that nasal disturbance may influence the muscles of the eye was referred to me by Dr. Sluder, December 16th, 1913. One hour previous he had injected the sphenopalatine ganglion of the right side with alcohol and carbolic acid to relieve a severe ganglion neuralgia. Immediately there was loss of motion outward in the right eye, and a slight flushing of the conjunctiva. Vision in the eye was found to be normal; there was no intra-ocular disturbance, and the action of the extrinsic muscles was normal, except that of the external rectus. In this muscle there was marked paresis, the eye moving very little beyond the middle line. The patient was an intelligent trained nurse . . . Time alone was relied upon to work the cure. . . . At the close of the eighth week the action of the muscle was practically normal, and completely so in twelve weeks.

"Palsies of the ocular muscles in connection with basilar injuries and gunshot wounds are not uncommon, but this is the first positive instance of an abducens paralysis produced by a small, localized, direct nasal injury that has come under my observation; and as it is a positive evidence of the intimate relation of this region to the oculomotor nerve supply, it is a point in clearing up the question of the dependence of oculomotor palsies on postethmoidal and sphenoidal sinus inflammation.

"Acting on the information obtained in this case of trauma, two recent cases of spontaneous abducens palsy have been referred to Dr. Sluder for nasal examination and treatment. The first case occurred in the right eye of a young woman, twenty-two years of age, who a week previous to the examination noticed that everything appeared double. At the time of the first examination, October 2nd, the vision in the right eye varied from 20/38 to 20/24, and in the left it was 20/20. In the right eye the vision could be improved to 20/20 by a weak concave lens. The muscular disturbance consisted of a slight nystagmus when looking strongly upward or downward. On the 6th there was positive restriction in the motion of the right eye outward, and a diplopia which was corrected by a prism of 25 degrees base outward over the right eye; left 20/24; fields normal; each fundus normal. The nasal examination, made the same day, revealed marked suppuration from the right sphenoidal sinus. Two days later this sinus was opened. On the 26th the recovery had so far progressed that the diplopia was corrected by a prism of 7 degrees base outward O.D.; the vision had risen to 20/20 plus, and was the same with + 0.37 sph. Three weeks later binocular vision had become re-established and the eyes were used freely and comfortably, the vision in each eye being 20/20 plus.

"The case is of especial interest because of the diplopia that was at first indefinite, the lowering of the vision in the right eye, the accommodative spasm and the nystagmus in extreme upward and downward exertion, all of which combined was an evidence of a general slight oculomotor and optic nerve toxæmic involvement. Later the abducens became most affected, probably by reason of the gravity of the toxic substance and because of proximity to the affected region, the abducens being the lowest of the oculomotor nerves in their passage through the sphenoidal fissure, and nearest to the postethmoidal and sphenoidal sinuses, as well as nearest to the sphenoidal sinus in its course over the clivus and around the posterior clinoid process of the sphenoid after its exit from the dura mater.

"In addition to the actual lesson taught in this instance, there is another presumable one, which is, that many of the hysterical amblyopias, and many of the temporary indefinite muscular anomalies and obscure disturbances of the accommodation ordinarily accredited to hysteria, may really be toxæmias due to nasal infection."

Ewing's second case was that of a boy, aged six years, in whom a complete abducens paralysis of the left eye was due to marked inflammation of the left sphenoidal sinus. As the result of "tentative treatment," the outward rotation after a month was normal, although binocular vision could not be maintained for any length of time. Vision was normal and there was no intra-ocular disturbance. In both of these cases reliance was placed in the local treatment, as in the case of trauma first mentioned.

Sluder's share in this communication is largely anatomical. He states the operation performed on the first of Ewing's spontaneous cases to be the Hajec radical postethmoidal-sphenoidal operation. He believes that palsy produced by toxins, rather than by the inflammation itself, is apt to the more rapid recovery. He agrees with Ewing in supposing that the nystagmus might be due to a general poisoning of the ocular nerve supply, and that transitory amblyopia and indefinite muscle disturbances may be explained in this way. He believes that hyperplastic sphenoiditis, simple and combined with acute inflammations, is the explanation of many of the disorders of the optic nerve, and many of the migraines, "many of the differences being explained by the fact that some of the nerve trunks pass through rigid bony confines and others through soft parts only." ERNEST THOMSON.

(7) In the case reported by **Bradburne**, of Manchester, the patient, a woman, aged 27 years, suffered from occipital headache and paresis of one external rectus muscle, together with a slight inflammation of the corresponding optic disc. Neuritis of the other eye developed later. The paresis and neuritis had followed a bad "cold in the head," which was accompanied by copious nasal discharge. A rhinological examination, however, yielded negative results. But on the day after the nasal examination there was a purulent discharge from the nose, which lasted for a week. This event was followed by improvement both in the optic papillitis and the paresis of the external rectus. SYDNEY STEPHENSON.

(8) **Shahan**, of St. Louis, emphasises the importance of careful examination of the nasal accessory sinuses in cases of optic neuritis. He refers to the recent literature on the subject, including the article by Ewing and Sluder, an abstract of which will be found above (No. 6).

"It is already certain," says Shahan, "that numerous cases of optic neuritis that formerly would have gone on to atrophy, are being permanently cured. Also we can think of other and more hopeful things than brain tumours at sight of swollen nerve heads." He then reports two cases. In the first, there was violent headache, failure of vision of the left eye, but no *definite* abnormalities of discs. Sphenoidal abscess was diagnosed by Sluder, and operated upon by that surgeon. The patient recovered V.A. 20/19, the disc being slightly paler than that of the right eye. In the second case there was violent double optic neuritis of choked disc type. Diagnosis by Sluder of sphenoidal suppuration. The two sphenoidal sinuses were operated upon at an interval of about ten days. Progressive improvement took place, the V.A. rising from R. 20/48, L. 3/15 eccentric, to R. 20/19, L. 20/24. Diplopia had been present; this also disappeared.

The general symptoms may be studied in the original where full details are given. The main point is the emphasis to be laid upon the association between optic neuritis and disease of the accessory sinuses.

ERNEST THOMSON.

IX.—REMEDIES.

(*Eighth Notice.*)

(1) **Fromaget, Camille.—On the inefficiency of neo-salvarsan in heredo-syphilitic keratitis. (Inefficacité du néo-salvarsan dans la kératite hérédo-syphilitique.)** *Ann. d'Oculistique*, septembre, 1914.

(2) **Morgenroth, J.—The chemotherapy of pneumococcus infection.** *American Journal of Ophthalmology*, February, 1915 (being translation of part of a paper by Morgenroth in *Berliner klin. Wochenschrift*, November 23rd and 30th, 1914.)

(3) **Puscariu, Elena.—The action of optochin in blennorrhoic conjunctivitis.** *American Journal of Ophthalmology*, January, 1915 (being translation of a paper by Puscariu, of Budapest, in *Klin. Monatsbl. f. Augenheilkunde*, September, 1914.)

(4) **Kempster, Christopher.—The treatment of trichiasis by means of the X-rays.** *Brit. Med. Journal*, February 20th, 1915.

(5) **Dunn, H. Percy.—Some aspects of the ciliary body in health and disease.** *Lancet*, May 29th, 1915.

(6) **Bernoulli.—Noviform in the treatment of eye diseases.** *Münch. med. Wochenschrift*, January 12th, 1915. Abstract in *Brit. Med. Journal*, July 17th, 1915.

(7) **Collins, E. Treacher.—An epibulbar epithelioma which completely disappeared after one application of radium bromide.** *Trans. Ophth. Society U.K.*, Vol. XXXV, 1915, p. 215.

(8) **Mayou, M. S.—A case of retinitis pigmentosa treated by trephining.** *Trans. Ophthal. Society U.K.*, Vol. XXXV, 1915, p. 357.

(1) **Camille Fromaget**, of Bordeaux, gives the histories of seven cases of interstitial keratitis occurring in patients suffering from congenital syphilis and treated by intra-venous injections of neo-salvarsan. From a study of these he concludes that the treatment neither stops the disease, shortens its duration, nor prevents its development in the second eye, but it has a very favourable influence on the general condition of the patient and on any other syphilitic manifestations which may be present. In two cases of keratitis due to acquired syphilis, the author found that injections of neo-salvarsan had a very favourable influence on the corneal lesions. The difference between the results obtained in the two classes of cases leads the author to conclude that Igersheimer is right when he suggests that spirochætes lodged in the cornea from fœtal life are under abnormal biological conditions and react in a special manner towards chemical substances with which they may come in contact, and he suggests that a method of making the chemical substances active towards congenital spirochætes should be sought.

R. J. COULTER.

(2) In the absence of continental medical journals at the present time, it may be allowable to make a second-hand abstract of the paper by **Morgenroth**, which is partly translated in the *American Journal of Ophthalmology*.

Experiments on animals, while difficult owing to the resistance of the cornea to typical pneumococcus infection, have shown that a 1 per cent.

solution of optochin hydrochloride penetrates the corneal epithelium and the corneal tissue in a few minutes and reaches all the terminations of the sensory nerves. In this way the anæsthetic action of optochin, which the alkaloid shares with many other quinine alkaloids, proves its penetrating power. The base in oily solutions acts in the same manner. Subconjunctival injections of 0·5 cc. of a 0·5 per cent. solution are borne by the rabbit's eye without any damage. It was found by Ginsberg and Kaufmann in Morgenroth's laboratory that virulent pneumococci brought between the lamellae of the cornea are killed by optochin without damage to the cornea. Subconjuctival injection was the most efficacious method. The author next proceeds to quote the opinions and the methods of different observers who have employed optochin. Thus, Leber successfully employed a 1 per cent. watery solution of the base dropped into the conjunctival sac or applied to the ulcer on a cotton pledget. In about three-fourths of the cases after a rapid cleansing of the ulcer a quick and lasting cure resulted ; in others the healing was slower. In a few cases the first arrest was followed by an exacerbation with a new infiltration which was less influenced by treatment. Leber thinks the tissues develop a resistance to the remedy (The word used in the translation is "fastness"). Goldschmidt employed a 1 per cent. solution of the hydrochloride instilled every hour, the solution being allowed to cover the cornea for half-a-minute. Schur used a 2 per cent. solution of the hydrochloride, applied on a pledget of cotton only to the actual ulcer. In a further communication Goldschmidt recommended an ointment with atropine added to the hydrochloride of optochin. The application is painful, and should be preceded by cocain. This short abstract may be concluded by a quotation from the last-named author :—"Optochinum hydrochloricum is a chemotherapeutic agent which in an absolutely specific manner kills the pneumococcus. . . . This specific action is so pronounced that if this therapy fails we must think of another incitor of the ulcus or of a mixed infection. In some very rare cases there seems to be an innate poison fastness of the particular pneumococcus strain. I have seen only two such cases in about 100. . . . . Only the pneumococci are destroyed, the tissues are not lastingly damaged when it is used in the concentrations above referred to. Therefore, no defect is caused in addition to that present at the beginning of the treatment ; in consequence the resulting scar is as small as at all possible. Since the scar is, moreover, less opaque, vision is mostly relatively good. Finally, the application is simple and the cost of the treatment is small."

ERNEST THOMSON.

(3) The remarks at the beginning of the foregoing abstract of an article by Morgenroth apply equally here.

Puscariu, of Budapest, has had the opportunity in Stanculeanu's clinic of studying the action of optochin in a few cases of gonorrhœal conjunctivitis. In all of the eight cases treated the result was good. Hydrochloride of optochine was used in 1 per cent. and in 2 per cent. solutions. The former was instilled every hour, the latter every two hours. The lids were everted when the instillation was made and held in this position exposed to the fluid for one minute. The instillations were preceded by plentiful washing, in order thoroughly to remove all secretion. No symptoms of intoxication and not the slightest irritation have been observed with the treatment. The cases are given in detail, but it will here suffice to summarise the very excellent results obtained.—Cure was considered to have taken place only when the gonococci had completely disappeared from the secretion. All of the cases could, from the clinical symptoms, be considered as cured long before the gonococci had altogether disappeared. The eight cases are divisable into three groups. *Group I.*—One case in which the optochin was used forty-eight hours after the beginning of the disease, and in which in three days a cure and the disappearance of the gonococci was reached. *Group II.*—Two cases, in which the optochin treatment was commenced on the 5th and 7th days. In the first of these cases the gonococci were gone from one eye after twelve days of treatment, while there were still some few in the fellow eye. In the second case the gonococci had disappeared after fourteen days. *Group III.*—Five cases in which the treatment was commenced in from four to six weeks after the beginning of the disease, in its period of recession. In all of these cases, a cure and the total disappearance of gonococci was effected, in two cases after two days, in two cases after three days. In one case there were still some gonococci present after seven days.

The authoress concludes that the optochin treatment of the gonorrhoic conjunctivitis produces a rapid cure in recent and receding cases, while in cases in which the disease is at its height (up to 14 days) treatment must be continued for a longer period in order to get rid of all gonococci. "We believe," she says, "that all oculists will agree that a maximum of fourteen days for the cure of the severest cases is comparatively very short. . . . From all this it is plain that the action of optochin on gonorrhoic conjunctivitis is superior to that of silver nitrate. It is furthermore preferable in practice because its application need not be made by the physician, as is necessary with silver nitrate. From our experience we recommend the following mode of treatment :—In cases with very profuse secretion and severe inflammatory symptoms, hourly instillations of a 1 per cent. solution, having previously washed off all secretion with boric acid solution, or weak collyrium luteum. In this way ten to fourteen instillations are made during 24 hours. When the secretion stops and the infant opens the eyes—be this due to the 1 per cent. optochin or any other remedy, or to the natural course in untreated cases—use after washing 2 per cent. optochin instilled every two hours. The instillation must reach the whole surface. To this end we turn the eyelids and hold the conjunctiva for one minute exposed to the fluid."

It may be said that in one or two of the cases there was corneal infiltration and ulcer, but the authoress does not make any pointed reference to corneal ulcer as in any way influencing the treatment. ERNEST THOMSON.

(4) On the strength of a single case **Kempster,** of London, strongly recommends the employment of X-rays as a cure for in-growing eyelashes. Two applications were made, and the cure has already lasted for about four-and-a-half months. SYDNEY STEPHENSON.

(5) The article by **Dunn,** of London, is mainly concerned with the value of thyroid extract in the treatment of certain types of cyclitis, such types being regarded as symptomatic of hypothyroidism. The therapeutic value of thyroid extract is also manifest in those cases of corneal ulceration amongst the poor, the cause of which is generally attributed to debility. Among these are included the cases which in "olden days" would have been described as "strumous" ophthalmia. Persons who look "strumous" now emphasize the general signs of hypothyroidism, and these signs vanish under thyroid treatment.

The term "vicious circle" may be applied to cases of metabolic toxæmia affecting the ciliary body. The primary stage is auto-intoxication, arising presumably in the intestines. To combat the toxæmia, the thyroid gland through its secretion is called upon to make strenuous efforts under the influence of excessive stimulation. For a time these efforts are successful. Later on the thyroid fails and we have hypothyroidism. With this begins a pervading uncontrolled toxæmia. Accompanying this and dependent upon it is the last stage, that of diminished resistance of the tissues, rendering them a prey to bacillary infection.

The author has some very interesting remarks to make upon the subject of that form of cyclitis which accompanies the interstitial keratitis of hereditary syphilis. He can recall many cases in which the interstitial attack may be the only manifestation of the disease, and he concludes that congenital syphilis may be at times a very benign disease, the presence of which is displayed only when some adventitious tissue environment renders its manifestations possible. Frequently, the general condition of the patients is more noticeable than the ocular signs of which they complain. These children are mostly wasted, pallid, feeble, with malnutrition actively marked. The stigmata of syphilis in active virulence are not here exhibited in the general condition of the patient. On the contrary, the general signs are those of metabolic toxæmia, of depressed vitality arising from hypothyroidism. Dunn's view of this disease closely corresponds with that of Elschnig, namely, that the disease is a degenerative one, due to disturbance of nutrition arising from toxins circulating in the blood stream. He believes that the pronounced objective signs of malnutrition indicate that the syphilitic manifestation is secondary to, and has only been rendered possible by the metabolic toxæmia present, and considers it unscientific to treat these cases with "606" and by leeching for the relief of photophobia. It may, or may not, be admitted, says the author, that there is but little syphilis in these cases, but the fact, nevertheless, must be conceded that the disease is overshadowed by the evident malnutrition. The persistent method of treating these cases as if they were purely syphilitic, by heroic measures, has probably been accountable for the notorious repute they possess of requiring a prolonged period of treatment. The line of treatment followed by Dunn is to begin with three grain doses of thyroid extract twice daily, and fomentations and atropine locally. As the nutrition improves, the ocular signs diminish. If interstitial keratitis be purely and wholly a syphilitic lesion, how is it curable, he asks, without anti-syphilitic treatment? "Impartial reasoning suggests that except for the tissue environment of pronounced diminished resistance the attenuated spirochæta pallida of a benign congenital transmission would fail to exert its pathogenic influence. The possibility of this view being correct throws emphasis again upon the value of recognising the vulnerability of the ciliary body—practically the blood organ of the eye—to metabolic disturbance. It emphasises, too, the therapeutic advantages to be gained by combating such toxæmic manifestations by thyroid treatment." As Herthoghe, of Antwerp, has said, "The day is coming when we will interrogate the thyroid equation (hypo- or hyper-) in all our patients with the same fidelity that we enquire to-day into their previous history as regards tuberculosis, syphilis, and alcoholism."

The dose of the extract employed by Dunn for children beyond five years of age, and for adults, is three grains twice daily. From this dosage he has never seen any ill-effects.

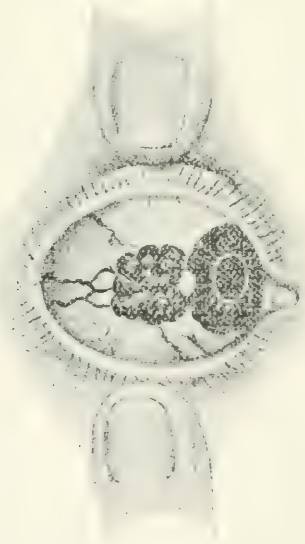
This interesting article may be recommended to all ophthalmologists for perusal in the original. ERNEST THOMSON.

(6) **Bernoulli** is an enthusiastic advocate of the use of noviform in a strength of 3, 5, or 10 per cent. in various inflammatory diseases of the eye and its appendages. Usually diseases of the eyelids and cornea are treated by the general practitioner with boracic lotion and yellow ointment. But since noviform was introduced in 1912 in the treatment of these conditions it has deservedly displaced the older remedies in the opinion of many oculists.

The author has used noviform for two years, and has found it act rapidly in cases of blepharitis which had proved refractory to weeks and months of treatment with boracic lotion and white or yellow precipitate ointment. Both these ointments can, in fact, be dispensed with in the squamous and ulcerative forms of blepharitis, but the yellow ointment is still to be recommended for eczematous and phlyctenular conjunctivitis. Noviform is non-irritant, and as it causes no burning or pain, the patient can be trusted with it for home use. In chronic blepharo-conjunctivitis it is advisable to give the eye zinc baths before the noviform is applied in the form of a 5 to a 10 per cent. dilution in vaseline, which is applied two or three times a day. Eczema of the face, accompanied by eczematous conjunctivitis, rapidly disappears when treated with a 20 per cent. noviform ointment. Again, when foreign bodies have been removed from the cornea, the application of a 3, 5, or 10 per cent. noviform ointment reduces the risk of infection. Since he began using noviform, the author has seldom seen ulceration of the cornea follow the removal of a foreign body from the eye. In some cases it is advisable to combine the noviform vaseline with 1 per cent. of atropine, so as to hasten painless recovery.

(7) This case and its cure by radium by **E. Treacher Collins**, of London, read almost like a modern miracle.

The condition depicted in the accompanying figure was found in a man, 80 years of age. The history of the growth extended over a period of six years. The growth, as proved by microscopic examination, was an epithelioma extending into and infiltrating the episcleral areolar tissue. At the Radium Institute, London, 10 mgrm. of radium bromide on a circular disc, 1 cm. in diameter, unscreened, was held over the growth continuously for fifty minutes, the eyelids being meanwhile kept apart by a speculum. There was no violent reaction, and when the patient was seen a fortnight after the application, the nodulated growth had disappeared, except for small portions at the inner and outer margins. Five months later, there was no sign of



Shows the appearances of the epibulbar epithelioma previous to the application of radium bromide.

any growth, and the eye was no more congested than its fellow. The neighbouring parts had not been injured in any way.

In the light afforded by the foregoing and other cases of epithelioma of the limbus, Collins discusses the extension of these carcinomata in and around the eyeball, with especial reference to Handley's theory of "centrifugal lymphatic permeation"—that is to say, the extension of carcinoma along the lymphatic vessels and the intercellular lymphatic clefts and the lodgment of carcinoma cells as emboli in the lymph glands draining the region where the tumour is situated. The dissemination of cancer, on this view, depends to a very small extent, if at all, on the entrance of cancer cell emboli into the blood stream, for there is evidence to show that cancerous epithelium on reaching that fluid is either destroyed or rendered incapable of further growth. The cancer cells appear to excite thrombosis, and the thrombus in the course of organisation, contracts and destroys them.

Epibulbar epithelioma almost always starts at the limbus, a predisposing factor, as pointed out by Alt ("Lectures on the Human Eye," 1880, p. 74), being the normal presence in that position of one or more papillæ dipping into the underlying tissues. "Between these papillæ we sometimes find, in the healthy eye, a proliferation of epithelium, the latter growing in the form of conical processes in the depth of the tissue" (Fuchs). At first, the neoplasm is movable with the conjunctiva, and cases are known where under such circumstances, it has been completely removed, without recurrence. On reaching the surface of the sclera (a structure with very few lymphatics), the growth may form a considerable mass before it invades the deeper parts. As Collins remarks, "it will often ulcerate, and fungate out, so as to overlap a larger area of the surface of the globe than that to which it is attached." A case is mentioned as touching upon this point, where the basal attachment of an epithelioma measured 13 mm. across, while the part that had fungated measured 17 mm. in its widest part, and was raised 8 mm. above the surface of the globe. It had penetrated down through half the thickness of the sclera, but had not permeated any of the lymphatic channels into the interior of the eyeball. Such a condition would probably have been amenable to radium.

Bowman's membrane offers considerable resistance to the spread of a limbal epithelioma into the cornea proper. The new growth often extends some distance in front of that structure without invading the substantia propria. But when the last-named is reached, columns of cancer cells extend along the lymphatic spaces between its layers. Casolino (*Archivio di Ottalmologia*, Vol. X, 1911) explains the greater resistance offered to the spread of epithelioma by the sclera than by the cornea by the presence of fewer lymphatic spaces in the former than the latter. A growth which has once penetrated into the substantia propria of the cornea soon reaches the lymphatics connected with the canal of Schlemm, and extends along them to the canal itself. An epibulbar epithelioma spreads readily once it attains Tenon's capsule, and surrounds the external surface of the sclerotic. The neoplasm may extend from Tenon's capsule into the orbit, or it may encircle the cornea, "pericorneal epithelioma" by extension of the growth into the anterior part of the capsule. In still more extensive involvements of Tenon's capsule, the globe becomes almost surrounded by the growth, the so-called "peribulbar epithelioma," of which descriptions have been published by Heyder, Lagrange, and Reiss. As a sequel to involvement of Tenon's capsule, the neoplasm may even extend to the eyelid. It is unlikely, when an epibulbar epithelioma has extended into the interior of the eye, that radium would succeed.

In epibulbar epithelioma it is rare for the lymphatic glands to become involved (Lagrange). It need scarcely be pointed out that an enlargement of the glands does not necessarily imply that they have become infected with a cancerous growth. An ulcerating or fungating epithelioma might readily cause an inflammatory enlargement of the adjacent lymphatic glands. There are exceedingly few records of a conjunctival epithelioma spreading to the facial glands.

Collins' communication will well repay perusal in the original.

SYDNEY STEPHENSON.

(8) This important practical communication by **Mayou,** of London, sets forth the results obtained by trephining a patient, seventeen years of age, who was affected with retinitis pigmentosa. The improvement, at the time of writing, had been maintained for four and a half months. Mayou is inclined to believe that it may be due to flushing of the retinal vessels, combined with a freer excretion of fluid and better drainage of toxic products from the eye.

The patient's complaint was of night-blindness of two years' duration. There was a history of a similar condition in grandfather, father, one paternal aunt, and one brother. Corrected V.=6/9. Visual fields (repeated examinations) varied between the 10° and 20° circles. Lenses clear. Optic discs slightly grey. Retinal vessels of almost normal size. Fundus changes typical of retinitis pigmentosa. Paracentesis was performed twice on the left eye, with improvement in the field on each occasion. A week after the last operation, the same eye was trephined under the influence of a general anæsthetic. The result can only be described as extraordinary.—One week after the trephining, the field of the eye that had been operated on had practically returned to normal, and the patient averred that she had completely lost her night-blindness. The field of the other eye had meanwhile remained without change.

SYDNEY STEPHENSON.

BOOK NOTICES.

Clinical Studies of Ocular Palsies. By C. O. HAWTHORNE, M.D. (Reprinted from *The Universal Medical Record*, 1915, pp 289-405.) No price stated.

We have received a copy of Dr. Hawthorne's articles in *The Universal Medical Record* in the form of a nicely got-up reprint.

Apart from the interest of the cases studied, one feels that Dr. Hawthorne deserves the thanks of the profession for his reiterated insistence on a policy of "thorough" in dealing with the eye. In previous articles from his pen we have found him demanding a more thorough instruction in ophthalmology for the general practitioner. In this article the ophthalmologist is urged to be more careful than he is apt to be in getting at the root cause of ocular palsies. "The general lesson which these studies teach and illustrate, is that every ocular paralysis, without exception, ought to be regarded as an event which demands the application to the patient of a thorough and comprehensive scheme of clinical examination." Again, "If . . . advice and treatment are based on an examination restricted to the local condition, they must, it is obvious, lack all sure foundation. Whatever may be done to relieve the paralysis and the accompanying diplopia, the essential and most important element in the diagnosis will be neglected. There is only one way to prevent such neglect, namely, to leave no part of the body unscrutinised and unexplored." These words are so obviously true that everyone will be found to agree with them. Yet the thing aimed at is an ideal very often unrealized. It is certain that few practitioners, whether specialists or otherwise, are sufficiently expert in all departments of medical knowledge to carry out such a thorough examination personally. The case must be referred to one or more other practitioners in order that the "overhaul" may be complete. If the patient is in a position, and willing to pay for such examination, the information required will be obtained. If not, it is, in the reviewer's opinion, doubtful whether the result will be all that can be desired. Take the case of a patient attending at a busy out-patient department. The ophthalmologist requires the opinion of a rhinologist as to the accessory sinuses, of a neurologist as to his nervous system, of a hæmatologist, and so on. But the rhinologist, the neurologist, and the hæmatologist are all busy, and the chances of a really thorough examination being made by any one of them are problematical. It should not be so. The hospital patient should have the same chance as the paying patient—in theory. But has he?

Dr. Hawthorne is to be congratulated on his constant effort to reach an ideal, which, however much to be desired, is not easy to arrive at under the hospital system of this country. ERNEST THOMSON.

Transactions of the Ophthalmological Society of the United Kingdom. Volume XXXV. Session 1915. With list of Officers, Members, etc. London: J. & A. Churchill, 7, Great Marlborough Street, W., 1915. Price 12s. 6d. net.

The present volume of the *Transactions* comprises the proceedings of the Ophthalmological Society during its thirty-fifth session, held in London in April, 1915. It is, as usual with these volumes, well and liberally illustrated. Its contents will receive notice in our columns in due course.

The Extra Pharmacopœia. By W. HARRISON MARTINDALE AND WYNN WESTCOTT. Sixteenth edition, in two volumes. London: H. K. Lewis, 136, Gower Street, W.C. 1915. Price: Vol. I, 14/- net; Vol. II, 7/- net.

This old friend, now in its sixteenth edition, is very welcome and as indispensable as it ever was to the consulting room. For the first time in its history, it has now been brought out as two volumes. We gather from the preface that volume one "includes everything the physician and pharmacist are likely to require for immediate reference on therapeutic matters, whilst the second volume acts as a supplement for further study."

Squint: Its Causes, Pathology, and Treatment. By CLAUD WORTH, F.R.C.S. Fourth edition. London: John Bale, Sons, & Danielsson, Ltd. 1915. Price 6s. net.

Mr. Claud Worth's book on "Squint" stands in a class of its own by reason of the clear and distinct manner in which it records the author's observations and the practical value of the methods of investigation and treatment described in it. A new edition of such a treatise is always welcome, but the author had made so sure of his facts before publishing the first edition, that he has not found it necessary to make any great alterations in the subsequent editions. There are some changes in the illustrative cases chiefly in bringing the histories up to date, and a much more hopeful view is taken of the possibility of curing cases belonging to the group described as "neuropathic divergence." The author finds that although operation is seldom needed in cases which are efficiently treated from the first appearance of the deviation, it is frequently necessary in neglected and inefficiently treated cases. In these he has completely abandoned the combined operation and relies entirely upon advancement by his own method, in the description of which there are considerable alterations with regard to minor points of *technique*.

The book remains one with the contents of which every ophthalmic surgeon should be thoroughly familiar. R. J. C.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

THE TREATMENT OF CATARACT IN INDIA.

LT-COLONEL H. SMITH'S CATARACT STATISTICS.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—Will you give me space to correct the cataract figures given by Lt.-Colonel H. Smith in his article in your May issue (pp. 161 and 163)? I may say first that cataract and therefore the operation for its relief, is, like stone, not nearly so common in Bengal as in the Punjab, and we have no towns named after the itinerant cataract coucher. I give the figures of cataract operations performed in Bengal as given by Colonel Smith, and as they were, side by side:—

Year.	Col. Smith's figures.	Actual number.
1910	4266	4266
1911	4953	4953
1912	2464	5679
1913	1291	5891

The inference that might be drawn from Colonel Smith's figures, *viz.*, that cataract operations are becoming extinct in the Lower Provinces, is not correct therefore.

The mistake has arisen from his leaving out all the cataracts performed in Behar and Orissa, which before 1912 were given in one Report with Bengal, and, for the purpose of comparison with previous years, should have been included by him.

He has, on the other hand, included the figures for the North-West Frontier Province with those of the Punjab, though they have been kept separately since the formation of the new Province. Either they should not have swelled the Punjab figures or Behar and Orissa should have been included in Bengal.

There is no doubt that the figures in Bengal would be very much larger were more adequate accommodation provided for ophthalmic cases, patients as it is coming from the Punjab and other parts of India, and one is glad to know that the site is now being cleared for the new Calcutta Eye Hospital, which will be larger, up-to-date, and more worthy of the Presidency than the present out-of-date and wholly inadequate structure.

I am, Sir, etc.,

F. P. MAYNARD, M.B., F.R.C.S., LT.-COL. I.M.S.,
Prof. of Ophthalmic Surgery, Medical College.

CALCUTTA,
June 8th, 1915.

P.S.—Colonel Smith's 1913 figures for Bengal, *viz.*, 1291, refer to Calcutta only, and entirely omit the rest of Bengal.—F.P.M.

[Obviously Lt.-Colonel Maynard is correct in adding the Behar figures in 1912 and 1913 to the Bengal total.—ED.]

THE INTRA-OCULAR PRESSURE.

To the Editor of THE OPHTHALMOSCOPE.

DEAR SIR,

It is clear from Col. Elliot's review in the July number of THE OPHTHALMOSCOPE (p. 346), of my paper in the *Moorfields Hospital Reports*, that I have expressed myself with some ambiguity on the question as to whether the readings obtained by the Schiötz tonometer accurately represent the intra-ocular pressure in millimetres of mercury.

My position was, that not having investigated this particular point, "I had *no reason* to doubt" that they did so. I certainly was not in a position to assert that this was the case, and I believed that my next sentence would indicate that I felt some doubts of it.

My paper was written in ignorance of the fact that Mr. Priestley Smith was investigating this very point, and he has indeed proved that Schiötz's figures, as representing millimetres of mercury, are not reliable.

The accuracy and usefulness of this tonometer for comparative purposes are, of course, not in question.

Yours very truly,

R. FOSTER MOORE.

17, BENTINCK STREET,
MANCHESTER SQUARE, W.
August 13th, 1915.

NOTES AND ECHOES.

Deaths.

It is with sincere regret that we announce the death of James Ryley, which took place on July 25th at his residence, Ferryside, Southtown, Great Yarmouth. Dr. Ryley was ophthalmic surgeon to the Great Yarmouth Hospital, and a member of the Oxford Ophthalmological Congress. He was once ophthalmic assistant to University College Hospital, London. He was a Justice of the Peace, and in 1898-99 was Mayor of Great Yarmouth. Dr. Ryley was the very embodiment of geniality.

We regret to announce the death of Mark D. Stevenson, of Akron, at the early age of 39 years. He was oculist to the Akron City Hospital, and to the local Children's Hospital. Dr. Stevenson's death was as tragic as it was unexpected. While preparing for an operation he sustained a scratch beneath one nail, which became infected during the operation, and rapidly led to a fatal issue. Stevenson was married as recently as January last.

The death is also announced of Edward S. Peck, of New York.

* * * *

Sir William Gowers' Will.

THE late Sir William Gowers left unsettled estate valued at £13,988.

* * * *

Hemeralopia v. Nyctalopia.

IN the *British Medical Journal* for July 31st, 1915, Leonard Guthrie, honorary secretary Nomenclature of Diseases Committee of the Royal College of Physicians, discusses the well-known confusion as to the proper meanings of the terms hemeralopia and nyctalopia. He goes back to Hippocrates, Galen, and Aristotle in the course of his investigation; but surely it would be more practical to leave the words out of the *Nomenclature of Diseases* (a solution of the difficulty which some writers on the subject have already anticipated by the substitution of the English words "day-blindness" and "night-blindness"), than to stereotype a meaning for each term. Guthrie himself declares that he is not prepared to agree to this proposal, which has been made "by certain distinguished ophthalmologists," and further suggests that "if it is necessary to provide a word which implies vision by day but blindness by night, it should be 'hemeropia,' but certainly not 'hemeralopia.'"

In the *British Medical Journal* for August 10th, Sir John Tweedy points out that many years ago he and Dr. Greenhill determined, in connection with the preparation of *Quain's Dictionary of Medicine*, that nyctalopia means night-blindness, and that the College of Physicians had accepted this view.

Nevertheless, the confusion between the meaning of the two words seems likely to continue, and many writers will probably prefer the English terminology.

* * * *

The American Ophthalmological Society.

At the annual meeting of the American Ophthalmological Society, held at New London, Conn., July 6th and 7th, 1915, the following officers and committees were elected.—

President: Dr. G. E. de Schweinitz, Philadelphia.

Vice-President: Dr. Peter A. Callan, New York.

Secretary-Treasurer: Dr. William M. Sweet, Philadelphia.

Council: Drs. Wm. H. Wilmer, Washington; R. A. Reeve, Toronto; Alex. Quackenboss, Boston; Arnold Knapp, New York; and Wm. Zentmayer, Philadelphia.

Committee on Theses: Drs. W. H. Wilder, Chicago; Alex. Duane, New York; and G. S. Derby, Boston.

The next meeting of the Society will be held in Washington, D. C., May 9th and 10th, 1916.

* * * *

The Middlemore Prize.

At the eighty-third annual general meeting of the British Medical Association held at the Connaught Rooms, London, on July 24th last, the Middlemore Prize was presented to Dr. R. Foster Moore by Sir Clifford Allbutt, the President-elect of the Association. Dr. Moore's essay dealt with "The pathology of the affections of the retina met with in connection with diseases of the kidneys."

* * * *

Professor Arthur Thomson.

The honorary degree of Doctor of Laws of the University of Edinburgh has been bestowed upon the famous anatomist, Professor Arthur Thomson, of the University of Oxford. Professor Thomson is well known to ophthalmic surgeons, both by reason of the original work he has accomplished upon the anatomy of the eye, and by the interest he has taken in the Oxford Ophthalmological Congress. It will be remembered that on the last two occasions the scientific work of the Congress has been carried out in the Department of Human Anatomy at Oxford, kindly lent for the purpose by Professor Thomson.

* * * *

Appointments.

Dr. A. J. Ballantyne has been appointed lecturer on ophthalmic medicine and surgery in the Anderson College of Medicine, Glasgow, in room of Dr. A. Freeland Fergus, resigned.

Mr. J. B. Lawford has been appointed ophthalmic surgeon to the new hospital for officers at Euston (Endsleigh Palace Hotel), where Dr. James Taylor, widely known among ophthalmologists, represents neurology.

Mr. Montague L. Hine has been appointed assistant surgeon to the Royal Westminster Ophthalmic Hospital.

Mr. H. W. Boreham has been appointed school oculist to the County of Somerset.

The tendency of the times is shown by the appointment of Miss Davidson as non-resident house surgeon to Dr. W. G. Sym at the eye wards of the Edinburgh Royal Infirmary.

* * *

The papers set for the Oxford Diploma in Ophthalmology.

Dioptrics.

Monday, July 19th, 1915. 10—11.30 a.m.

1. What means would you adopt for ascertaining the muscular balance of the eyes? What importance would you attach to the results obtained?

2. What are the optical defects of lenses, and what arrangements exist in the eye to compensate them?

3. Define the following terms:—visual axis, optic axis, angles α and γ, visual angle, index of refraction, and critical angle.

Relation of Ophthalmology to General Medicine.

Monday, July 19th, 1915. 11.30 a.m.—1 p.m.

1. What ocular symptoms and signs would lead you to diagnose arterio-sclerosis? State briefly how you would examine such patients generally.

2. What ocular complications have been found to occur with cerebro-spinal meningitis?

3. Discuss the value of an examination of the fundus in the diagnosis of intracranial lesions.

Pathology.

Monday, July 19th, 1915. 2—5 p.m.

1. How would you make a naked-eye or museum specimen from a recently enucleated eyeball, and how would you distinguish between a right and left eyeball?

2. Describe the pathological anatomy of the several conditions that may be mistaken clinically for glioma (neuro-epithelioma) of the retina.

3. Enumerate the more important saprophytic micro-organisms that may be found in the conjunctival sac. Give the differential diagnosis between them and the pathogenic forms that may resemble them.

4. Describe the pathology of 'after-cataract.'

5. Discuss the causes of heightened intra-ocular pressure associated with an open irido-corneal angle.

6. What are the factors that tend to produce heightened intra-ocular pressure when a sarcoma of the uveal tract is present?

Diagnosis, Etiology, Treatment, &c.

Tuesday, July 20th, 1915. 10 a.m.—1 p.m.

1. Describe the differential diagnosis and treatment of the several affections of the palpebral conjunctiva accompanied by "granulations."

2. In what diseases are nodules in or on the iris found, and how would you differentiate clinically the various forms?

3. Describe the ocular manifestations of myasthenia gravis and state with what conditions they may be confused.

4. What rules would you follow in operating on a case of lamellar cataract? What operation would you adopt? How could you forecast the result of the operation on the refraction of the eye?

5. Name the conditions in which one finds blood-vessels in the cornea and describe the appearance in each case.

6. An elderly person whose radial arteries are thickened, and whose blood pressure is high, is siezed with sudden blindness, partial or complete, of one eye. What are the probable causes of the condition and how do you distinguish between them?

* * * *

An Examination in Ophthalmology.

OUR contemporary, *Ophthalmic Literature*, devotes an article in its June issue to the subject of an examination in ophthalmology in the United States. It appears that special committees of the American Ophthalmological Society, the section on ophthalmology of the American Medical Association, and the American Academy of Ophthalmology and Oto-Laryngology have reported favourably, and that the reports have received the approval of the parent associations. A plan has been drawn up. Briefly, a board will be appointed to arrange, control, and supervise examinations of those who purpose to enter upon the special or exclusive practice of ophthalmology. The requirements of candidates shall include graduation from a recognised medical college, at least two years before the special examination. Each successful candidate shall receive a certificate or diploma setting forth that fact, but not conferring any academic degree. The examinations may be held in any city of the United States where there are good facilities for conducting clinical and practical examinations.

"The advantages to be hoped for from such an examination," says *Ophthalmic Literature*, "are various. In the first place, the making of a clear distinction between those who have and those who have not made a proper preparation to practise ophthalmology is just as much needed as a clear distinction between those who have and those who have not prepared themselves to practise medicine. No one now claims that preparation to practise medicine implies a sufficient knowledge of modern ophthalmology to undertake the work which properly devolves on any oculist."

* * * *

The Influence of War.

THE war has altogether extinguished some ophthalmological journals and caused some of the others to appear at erratic intervals. For example, our esteemed contemporary, the *Annales d'Oculistique* for November, 1914, reached this office on August 3rd, 1915, nine months after the time. Beneath the normal date of issue, however, was the very candid statement:—"*Paru le Ier août*, 1915." This, at least, will settle the questions that might arise in the future with regard to priority, and so forth.

THE OPHTHALMOSCOPE DIARY.

	1915.	
American Academy of Ophthalmology and Oto-Laryngology	Oct. 5th to 7th	Chicago, Ill.
	1916.	
American Ophthalmological Society.	May 9th & 10th	Washington, D.C

THE
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A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

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ORIGINAL COMMUNICATIONS.

INDUSTRIAL ACCIDENTS AND DISEASES.*

BY

FRANK SHUFFLEBOTHAM, M.A., M.D.Cantab.

NEWCASTLE-UNDER-LYME, ENGLAND.

I VENTURE to think that never was there a time in the history either of medicine, or of this country, when it was more important to consider from a medical point of view the amount of damage done to the workers by accident and disease in the ordinary course of their employment. Great Britain can never claim to have been organized, in any sense of the term, from an industrial point of view ; but at the present time the needs of the country are such that it has been found essential that the nation should consider seriously the question of taking stock, so to speak, of our industrial possibilities with a view to raising to the highest possible standard the industrial efficiency of our country. One of the most important factors in the production of industrial efficiency is the health of the workers. It is almost a commonplace expression that man is the creature of environment, and this is specially true of the workman engaged in his daily toil.

I do not think that sufficient attention has been paid by the medical profession as a whole to the conditions of employment in this country, at all events by those whom we have regarded as the leaders of the profession. This may be due to the fact that the great centres of industry are far removed from the metropolis and from the best-known medical schools ; but the importance of the subject is fast forcing itself not only upon the medical profession, but upon the country as a whole, because, at last, it is realized that the prosperity, the security, and the health of the community at large, depends so much upon those engaged in the different industries.

To come from the abstract to the concrete, I want to refer, in the first place, to industrial accidents, and to draw your attention to the number of both fatal and non-fatal cases which have occurred in the seven principal industries of this country within the last five years. According to the Government returns, the seven great industries to which the statistics apply are mines, quarries, railways, factories, harbours and docks, constructional work, and shipping. In the last five years no fewer than 18,219 men and women have lost their lives, and *over two millions* have sustained injuries in the course of their employment. With regard to the non-fatal cases, no account is taken of those accidents where the injury is so slight as only to incapacitate the worker for seven days or under, but I would like to say that of the two million people who have sustained injuries, only 8·5 per cent. were kept away from work between one and two weeks, while 5 per cent. were incapacitated for from one to three months. The average number of work-people who sustain serious injuries which incapacitate them from work for more than a year, including permanent and total disabilities, amounts to about 12,000 a year.

In the mining industry alone, in which, roughly speaking, a million of men are employed, in the year 1913, apart from the fatal cases, nearly 200,000 men met with non-fatal injuries, and from the years 1909 to 1913, 863,000 were injured, while between 7,000 and 8,000 men were killed. It appears from these figures that in every five years a very large percentage of the total workers are injured ; and when one considers the millions of people who are engaged in all the thousand and one other industries apart from the seven great industries to which I have referred, the number of those who are incapacitated under the heading of " industrial accidents " is something colossal.

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* Introduction to a Discussion on Industrial Accidents and Diseases at the Oxford Ophthalmological Congress, on July 16th, 1915.

We just see the great problem that we have before us : we are not dealing with a few people here or a few people there, but with a very large percentage of the total workers of this country, and in the coal-mining industry we can say that, on the average, in every six years, everybody employed in the mines of this country is killed or injured.

I will leave the question of industrial diseases until later, as I feel that the great question of accidents is one that should seriously engage the attention, not only of medical men, but of all those who have at heart the well-being of the country.

It should seem no impossible task materially to reduce the number of accidents in our mines and docks and factories by preventive measures, and until the numbers are at least divided by two, we cannot say that the present methods of legislation with regard to the prevention of accidents are at all satisfactory.

Up to the present, the attention of medical men has been concentrated rather upon the immediate treatment of those who are injured, without much special reference to the manner in which the accidents have been produced ; but just as in the field of public health, medical men have been the pioneers of the greatest reforms, so I feel that in the question of industrial accidents medical men will have to consider, and will have to be consulted as to the best possible working conditions for the workers, and it will therefore be necessary for them to be conversant with every detail of the industry in which they are specially interested or in which their special work lies.

I know that medical men who have made suggestions along these lines up to the present have for the most part been regarded as faddists and sentimentalists ; but public opinion now appears to have taken a different turn, and there should be no difficulty in the future in insuring such working conditions for the men and women of this country that the predisposition to accident is very much lessened. Unfortunately, in past years, every advance that has been made for the improvement of conditions in factories and mines has always been met with the cry that the industry was being ruined. The introduction of the Factory Acts, the Workmen's Compensation Act, and the Acts of Parliament which have special reference to the regulation of coal mines, have always been received in the same way ; the complaint has been that the workpeople were being pampered and that the industry was being destroyed, and I think that the main reason for this course of events has been that innovations have been introduced by the politician and have never been sufficiently backed up by the medical profession. At the present time, however, we have such a volume of information collected from all the industrial centres in the country as to the results of the conditions of labour, I am confident that in the future improvements in working conditions will be generally welcomed instead of being hostilily criticised. In spite of all legislative attempts, we should not fail to remember what a large proportion of the working people of this country are seriously injured year by year, and it should be realised that *the number of accidents is on the increase* and not on the decrease. In the seven great industries, the number of non-fatal accident cases in the last five years is as follows :—

1909	332,612
1910	378,340
1911	419,031
1912	424,406
1913	476,920

This large increase is due very largely to the increased number of factory operatives and coal miners who have sustained injuries. During these five years the number of non-fatal cases which have occurred in the factories has increased from 123,134 to 208,949, while in the mines of the United Kingdom the number of workers injured has increased from 154,798 in the year 1909 to 193,387 in 1913.

It is our duty as medical men to endeavour to lessen the incidence of these accidents, and when we are directly dealing with those who have been unfortunate enough to sustain injury, to recommend such treatment, either in institutions or at home, that the injured man will be able to return to the industrial ranks, fit and healthy, in the shortest possible time.

I regard it a very great compliment to be asked to introduce this subject to-day, because this Congress represents practically the whole of the eye specialists in this country, and there is no organ in the body the examination of which can tell us so much as the examination of the eye. I am not going to refer to direct injuries of the eye, as this subject will be dealt with later by my friend, Dr. E. L. Collis, but every medical man who practises in an industrial centre knows the importance of the examination of the eye in almost every serious case of industrial accident. In cases of head injury and injury to the spinal cord, it is most essential that a complete examination of the eye be made in every instance ; if this examination is not carried out, the conditions may be mistaken, wrong treatment prescribed with sometimes disastrous results, and a misleading prognosis given. I remember a few years ago having been asked to examine a miner who had had a head injury two years previously. The injury was one of a large scalp wound, and the bone was bared, but there was no external evidence of any fracture of the skull. After the scalp wound had healed, the man complained of continual headache, his temper was always irritable, and he was unable to sleep at night. Eventually, mental symptoms supervened ; he threatened to commit suicide ; he said he should " do something " to his wife ; and on several occasions, he was missing from home for several days. On examination, I found the scar was adherent to the skull, and there was acute tenderness on pressure over the scar, and the symptoms were such that I thought there was some cerebral compression. The examination of the eye showed that this was so ; there was optic neuritis, and this was confirmed by Dr. C. E. Glascott, then of Manchester. An operation was performed, trephining was done at the seat of the injury, and the inner table was found to be pressing upon the brain at this point. The man made a successful recovery ; the mental symptoms and the eye symptoms cleared up ; and within twelve months he was back at work, and he has worked regularly as a healthy man since this time. This is only one example illustrating the importance of the examination of the eye, but such cases must be common in the experience of every member of this Congress.

In cases of traumatic meningitis, of cerebral compression, of cerebellar tumour, and in some cases of fractured base of the skull, the examination of the eye indicates the exact condition of the lesion that has been set up by the accident.

In speaking of examination of the eye, I do not wish simply to refer to ophthalmoscopic examination. The examination of the field of vision, of the visual acuity, of the condition of the muscles of the eyeball and the movements of the eyeball itself are all of equal importance. Mr. B. Cridland has shown at a previous Congress, in cases of traumatic neurasthenia, how the field of vision is contracted, not only for white but for blue and red, and I believe that in cases of traumatic neurasthenia, the examination of the field of vision has the greatest diagnostic value.

But the examination of the eye is of the greatest importance in detecting concurrent disease which is entirely independent of the injuries which have been produced by accidents, although in some cases the disease may be aggravated by the injury. By this means one is able to detect the effects of syphilis, diabetes, gout, and Bright's disease ; in many cases it is possible to diagnose arterio-sclerosis, which may be more obvious in the retinal arteries than even in the aorta or the large arteries of the body. The diagnosis of locomotor ataxy, or the early stages of general paralysis of the insane, may be made for the first time after a complete examination of the eye, and the symptoms of which the man may complain in any given case may be due to the disease, and not in any way to the accident.

I do not propose to deal with direct injuries to the eye as I have already indicated, but the frequency of the pneumococcal ulcer of the cornea among coal miners is a question which I would just like to refer to for a few moments. As you may naturally expect, the number of slight corneal abrasions occurring among coal miners is extremely great in every colliery district, and medical men practising in these districts know from their experience that a large proportion of these slight injuries are the beginning of prolonged ulceration of the cornea due to infection by the pneumococcus. I bring this subject before the notice of the Congress, not because I do not believe a single member is not perfectly familiar with this point, but I would like medical practitioners in colliery districts to pay special attention to the condition of the lacrymal sac in all cases of slight injury to the eye, and also in cases of conjunctivitis. Dr. Webster, of Newcastle-under-Lyme, tells me that in the North Staffordshire district he has literally come across scores of cases of pneumococcal infection of the lacrymal sac causing the most prolonged and serious corneal ulceration, and it is essential that the treatment of the lacrymal sac has got to occupy in the future a very much more important position in the general hygiene of the worker than it has done in the past, so as to safeguard the miner from the effects of the slight accidents to which I have already referred.

In cases of operation for cataract among coal miners, some surgeons believe it necessary to dissect out the lacrymal sac in cases of infection, as a preliminary operation.

Under my third heading I will refer to the question of industrial diseases. I am glad to say that industrial diseases have occupied more attention on the part of medical men than the after-effects of accidents, with the result that we have to deal with a very much smaller number of cases. In the year 1913, 501 cases of lead poisoning were notified and 2,402 fresh cases of miners' nystagmus arose, while there were seven recognised industrial diseases, including phosphorous poisoning, of which there were no cases during the whole year. It is impossible for me to do anything but merely to outline the important factors connected with industrial diseases and their relationship to the eye, but of the twenty-six diseases or groups of disease which form the Schedule to the Workmen's Compensation Act, I think I may say that the eye specialists may have to consider at times cases which may be associated with fifteen of these conditions.

I am anxious to avoid overlapping in this discussion, but I would like to say that the eye specialist may be the first to diagnose a case of lead poisoning where the general symptoms are subjective and the eye has not previously been examined. In the chemical industries, eye affections may arise from poisoning by the nitro-benzine products, by carbon bisulphide, by nickel carbonyl, as well as by nitrous fumes, and in processes in which salts of chromium are used one may find ulceration of the cornea, conjunctivitis, inflammation and sometimes ulceration of the eyelids, while pitch and tarry compounds are known to produce epitheliomatous ulceration of the corneal surface of the eye.

The eyelid is sometimes infected by the anthrax bacillus, and when this occurs, the eye surgeon may have to consider operative treatment after the specific treatment has been given.

But the most frequent of all industrial diseases is miners' nystagmus. During the year 1913, 2402 new cases were certified to the Home Office as being productive of incapacity for work, in addition to which 2149 cases had continued from the previous year, making a total of 4551, and apart from the men suffering from this disease to such an extent that they are unable to work, there are many thousands of coal miners who are working with the disease, but whose earning capacity and output of work are very much reduced in every case, and there are some thousands of other miners who have given up all idea of working in the mine, and who are either employed on the surface of the mine or as unskilled workmen in other ways, while many are unable to work at all.

It is generally admitted that the miners who have contracted miners' nystagmus are amongst the most skilled and the most industrious of their class, and from the point of view of industrial efficiency, it is a great loss to this country that the men should be so incapacitated.

We do not know the actual cause of miners' nystagmus, but we do know what the principal effects are in the causation of this disease, and as long as the illumination of the mine is so defective, we must try in other ways to reduce the incidence of this disease. It has been pointed out at this Congress in previous years, as well as at the Royal Society of Medicine and in other places, that some refractive error or some error in the refracting media is present in a large proportion of the cases of miners' nystagmus. Different observers give a different percentage, but all of them agree that it is sufficiently high. If a refractive error is such a striking factor in the production of miners' nystagmus, then surely men who are suffering from astigmatism and hypermetropia, opacity of the lens, and other like disabilities should be prevented from working in the mines in the first instance. In the ordinary course of life, if a boy be deformed in his limbs or hands or feet, then from the very outset, suitable employment is found for him, and it seems strange that when there are deformities, if I may use that word, of the eye, suitable work should not be found for him in callings in life other than mining. I believe that before a boy or a man be allowed to work in a mine, he should have his eyes examined, and if they are at fault, then he should be prevented from working in the mine, not only because he would be predisposed to nystagmus, but a man with defective sight must be a danger to his fellow workmen in such a dangerous occupation as that of mining. If this proposition be not admitted, then it may be said that a man is being directly encouraged to acquire a disease from which he may suffer more or less all his life, and he will be the very reverse of what is known as industrially efficient.

One case that has come under my notice lately will illustrate this point. A young man, 22 years of age, was certified as affected with miners' nystagmus in the middle of May of this year. I saw the man five weeks afterwards, when he complained of headaches, and he had an old squint, but I was unable to detect any oscillation of the eyeballs on that day. Mr. S. McMurray examined him, and found that he was suffering from marked long sight and astigmatism, besides having an old squint of 25 degrees, which had been caused by neglected long sight. This squint rendered the man practically a one-eyed man. It seems to me that this man should never have been allowed to work in the pit; he should have had spectacles at an early age, and had he been examined prior to working in the pit, his eye trouble would have been found out, glasses would have been prescribed for him, and he would have found suitable work in other directions, since it is impossible for miners to wear glasses at work.

In conclusion, I feel that in dealing with questions of industrial accidents and industrial diseases it is essential for medical men in every case to make a complete examination of the injured workman and to obtain a report upon the exact condition of the eye. The eye may be said to be *the gateway of the brain*, but its condition very often indicates some general disease from which the man may be affected after having completely recovered from the effects of the accident or the occupational disease from which he had been previously a sufferer. In this way, in many cases it may be regarded as the *periscope to the whole human frame.*

If accidents are to be prevented, and the incidence of disease lessened in the industries of this country, let me say again that it is essential that medical men should be conversant with all the details of these industries, so that they can be the pioneers of reform in this direction.

EYE INJURIES CAUSED BY OCCUPATION: THEIR PREVENTION AND FIRST-AID TREATMENT.[*]

BY

EDGAR L. COLLIS, M.B.,

H.M. MEDICAL INSPECTOR OF FACTORIES,

LONDON, ENGLAND.

EYE injuries are so prevalent in certain industries and means for their prevention and first-aid treatment are to-day so unsatisfactory as to demand consideration.

Eye injuries caused by occupation may be grouped in classes, which differ, not only in their origin, but also in prevention and treatment :—

1. Injuries arising from direct traumatism, such as from flying fragments of stone or metal. Injuries in this group, since they occur at a definite moment of time, are legal "accidents."

2. Injuries due to the presence of foreign matter, often in the form of dust particles, injurious on account of its chemical composition. Such injuries may occur at a definite moment due to a definite particle, or may be the result of prolonged exposure; and they occur from exposure to dust of pitch, lime, cement, or to splashes of acid or alkaline fluids.

3. Injuries following upon exposure to intense heat and light. These

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[*] Read on 16th July, 1915, at the Oxford Ophthalmological Congress.

The object of this paper was, by promoting discussion, to obtain information. This result was attained, and, particularly as regards first-aid treatment, what follows has been modified accordingly.

injuries, which can seldom be considered legal accidents, require sub-division into (*a*) acute; *e.g.*, conjunctivitis caused by exposure to the electric arc in the process of welding metals; and (*b*) chronic; *e.g.*, posterior cortical cataract seen in glass-makers exposed for years to heat and light from molten glass.

Prevalence.

Some estimate can be made of eye injuries the result of legal accidents, for information is published annually by the Home Office as to accidents which occur in—(i) mines and quarries, and (ii) factories and workshops; and although accurate details of the number of these accidents due to eye injuries is not stated, an approximation can be made. Among men employed in mines and quarries there were 186,000 accidents in 1913, and Simeon Snell[1], after taking five yearly periods from 1884 to 1898, found that the percentage of all accidents among coal-miners due to eye injuries showed a tendency to be constant at rather over five per cent. Coal-miners, as the result of eye injuries, suffer peculiarly from pneumococcal ulceration of the cornea, and the question is perhaps worthy of investigation as to whether such ulceration is unduly prevalent on those coal-fields, *i.e.*, Lancashire and South Wales, which experience an unduly high mortality from pneumonia.

The figures of Table I, column 6, for an entirely different group of accidents, show curiously that the same proportion, rather over 5 per cent., are due to eye injuries; again at 133 iron and steel works in America out of 18,959 accidents for which definite time was lost (and which, therefore, are comparable with our British figures), 5·6 per cent. were due to eye injuries.[2] This proportion, then, of any group of general accidents among males may fairly be attributed to eye injuries; and the inference may be drawn that about 9,300 cases of eye injury occurred among miners and quarrymen in 1913.

Table I.—Accidents among males employed on premises under the Factory and Workshops Acts.*

Year.	Class I—Reported to Certifying Surgeons.					Class II reported to Inspectors only.
	Eye Injuries.			All Accidents.		
	Loss of sight of one or both eyes.	Other.	Total.	Total.	Percentage due to eye injuries.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1910	55	1,954	2,009	37,515	5·4	81,307
1911	54	2,132	2,186	41,798	5·2	94,351
1912	55	2,185	2,240	43,986	5·1	99.065
1913	94	2,444	2,538	49,446	5·1	113,207
1914	55	2,368	2,423	45,093	5·4	100,568

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*Females are not included in these figures. They suffer less than males because (i) fewer women than men are employed in factories and workshops; the ratio is normally about 3 females to 10 males; and (ii) the nature of female employment does not entail exposure to the same risk. In the five years 1909-1913, there were 462 eye injuries among females compared with 10,568 among males.

Accidents in factories and workshops (see Table I), fall into two classes :—Class I which includes fatal accidents and those caused by machinery moved by mechanical power, molten metal, hot liquid, explosion, escape of gas or steam, or by electricity, and causing the injured person to be absent for at least one whole day from his ordinary work ; and Class II which includes any other accident disabling for more than seven days. Accidents in Class I are investigated by certifying surgeons, who report as to the part of the body affected ; and this class of accidents is grouped accordingly. Accidents in Class II are not so reported on, and are not so grouped ; but probably since Class II contains eye injuries due to flying fragments of metal and stone set in motion by manual labour, this class contains at least as large a proportion of eye accidents as Class I. In Classes I and II there were 162,653 accidents of all kinds among males in 1913, which on the five per cent. basis, gives an approximate figure of 8,100 cases of eye injury. Hence, the inference may be drawn that between seventeen and eighteen thousand eye injuries, more or less severe, occurred in 1913 among males employed in mines, quarries, factories, and workshops.

Table II.—Distribution of eye injuries among members of the Operative Stonemasons' Society of England and Wales, ten years, 1902-1911

Stone chiefly worked in place of residence.	Average annual membership.	Amount of compensation paid for injury to eyes, in pounds.	Average amount paid per member, in pence.
Sandstone	3,452	110	7·6
Limestone	2,996	209	16·7
Granite	1,015	304	71·9

Investigation, however, shows that some occupations, for instance, that of stone dressing, contribute more than their due share to this total. Thus, during the fifty years ending 1911 in the Operative Stonemasons' Society of England and Wales, 22 per cent. of the compensation paid for permanent accident invalidity was paid for injury to the eyes[3]. Some estimate of the prevalence and distribution of eye accidents among members of this Society may be obtained from the figures of Table II, which show that granite workers suffer by far the most, while men working limestone come next, with sandstone-masons last[4]. The special liability of granite workers is due to two reasons (i) the hardness of the stone, and (ii) the use of pneumatic tools ; and the prevalence of eye injuries among such workers in Aberdeen[5] has been made the subject of inquiry, see Table III. That the figures of this table are not in excess of the average, is shown by the following additional data :—in the twelve months, 1st July, 1909, to 30th June, 1910, 563 granite cutters were treated at the Aberdeen Eye Institution for foreign bodies in and abrasions of the eye, apart from other cases of eye injury ; and 131 were treated at the Aberdeen Royal Infirmary for eye injuries from 1st January to 30th September, 1911. Possibly, a few others were treated by private practitioners, and, since there were then in Aberdeen and district about 1,700 men employed as stone-cutters, one out of every two must have sought medical aid annually for eye injuries.

Table III.—Showing the number of granite dressers treated for injuries to the eye in (1) *the Aberdeen Eye Institution and* (2) *the Aberdeen Royal Infirmary.*

Character of injury.	Aberdeen Eye Institution, 1st July, 1908, to 30th June, 1909.	Aberdeen Royal Infirmary, 1st January to 31st December, 1910,	Total.
Foreign bodies in, and abrasions of, the eye ...	580	142	722
Septic ulcers	43 (28 of which required cauterising,)	5	48
Traumatic cataract ...	2 (In which the lens was extracted.)	2	4
Foreign bodies in ciliary region	2 (In which the globes were enucleated.)	—	2
Dislocated lens	1	3	4
Corneal wounds	17	2	19
Corneal nebulæ	—	4	4
Other injuries	—	6	6
All injuries	645	164	809

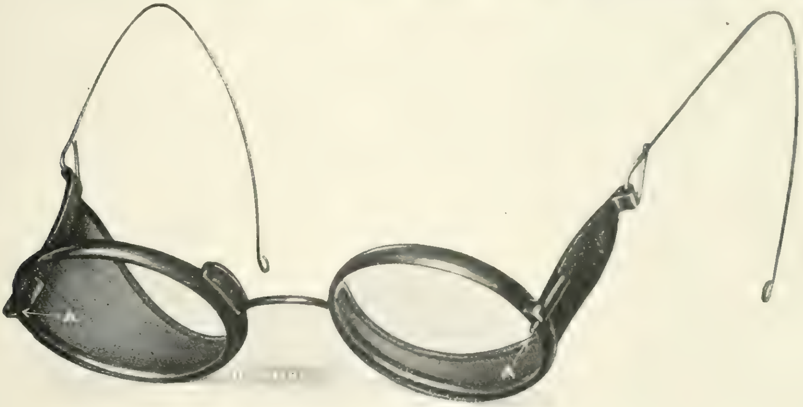
Eye injuries among masons are said to show a greater tendency to become septic if caused by a particle of stone rather than a chip of metal from the tool. Accepting this point, I desire to ask whether stones differ in this respect. Dusts from different stones certainly differ in the effect they produce when inhaled; and the suggestion was made in Aberdeen that skin abrasions were more liable to become septic when dark foreign granites were being dressed, than in the case of home granites. These foreign stones were found to contain traces of organic matter, and their dust appeared to stimulate microbic growth. Mr. N. C. Ridley tells me he considers that, in Leicestershire, injuries caused by slate are more liable to become septic than those caused by local granite.

Certain other industries also suffer unduly. Thus, Snell found,[6] owing to bursting bottles at one aerated water factory, 400 eye accidents in one year among about 3,600 operatives; while men employed in fettling and chipping metal castings, and in grinding metals, are exposed to special danger from flying fragments; and men engaged at hedge-cutting suffer in excess from injuries caused by thorns, although I have no statistics for these occupations.

Prevention.

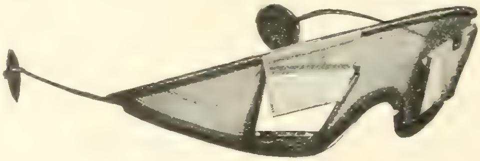
There can be little doubt that by suitable protection, the majority of eye injuries could be prevented. But what is suitable protection? The answer varies with the class of injury.

Class 1. *Injuries arising from direct traumatism.*—In 1912 in relation to stone dressing I[5] ventured to suggest that an eye-guard to be effective should (i) prevent particles reaching the eyes from in front, from either side, or from below—practically none enter from above; (ii) be light and allow free play of air, so that moisture does not condense on the transparent medium; (iii) not impede vision; and (iv) not become obscured by the



Designed by Messrs. Charnley & Sons.

impact of particles. And I think that as a protection against all sorts of flying particles, a guard complying with these requirements would be effective. That no particles enter from above is important, because the upper part of the guard may be left open and allows of ventilation ; a closed screen not only becomes hot and uncomfortable, but the transparent medium, usually glass, may be obscured by condensation of moisture. Where fine work has to be executed, there must be clear vision, and for this purpose no medium is better than glass. Against it three main objections have been raised :—(*a*) Operatives say it damages the sight ; Snell[7] considered this objection when raised against wire gauze—a more obstructive medium—and found no evidence whatever to support it. Personally, I think the objection rests on use of glass after it has become semi-obscured by impact of particles. (*b*) The glass broken by a flying fragment may be driven into the eyes, and cause a worse injury than if it were not present. I have found no record of such an injury, although I have seen many broken glasses ; and I believe this objection to be theoretical and contrary to experience. This opinion, moreover, is supported by the following quotation from an American shop bulletin[8] :—"In no instance was an eye even slightly injured by flying glass where the lens was broken by a flying chip." Doubtless, injuries can be instanced from broken glass, but in every case, probably, the eye would have been lost from the blow which broke the glass. (c) In time glass becomes pitted and obscured. This is true, and eye-guards should be so made that the glass can be easily removed and renewed. Messrs. Charnley and Sons, Leicester, and Messrs. Zimmer and Co., Finsbury Square, E.C., have placed on the market eye-guards to meet these requirements ; of these I rather prefer that of Messrs. Zimmer, because spectacles required to correct any error of refraction can be worn behind it (*see* Figs).



Designed by Messrs. Zimmer & Co.

Should acute vision not be required, a clear medium may be dispensed with and only a gauze screen used. Experience in Aberdeen showed that to stop injurious particles the mesh of such gauze must be at least thirty-two to the inch, a fineness which lessens visual acuity ; but in such occupations as stone breaking and bottling aerated water, a screen with a mesh sixteen to the inch is no impediment to work and effectively intercepts the fragments met with in these industries. To ensure adequate protection of those employed in the latter industry, the process of bottling aerated waters and processes incidental thereto were certified in 1896 by the Secretary of State to be dangerous and special rules were established.

A useful suggestion comes from America to prevent accidents due to flying nails, which are particularly serious, for out of fifteen reported injuries, four are stated to have resulted in loss of sight of one eye. At one factory corrugating or scoring the heads of the hammers used almost eliminated these accidents[11].

Class 2. *Injuries due to the chemical nature of the foreign body.*—Exposure to pitch dust is typical of this class of injury. Fortunately, fragments of pitch seldom become embedded in the eye, but dust particles containing pitch set up extreme irritation and lacrymation, and among those exposed to it for years, the portion of the sclerotic usually uncovered by the eyelids is stained and dull. Moret, of Charleroi, has dealt with this subject in an excellent monograph[9] ; but I wish, as the result of personal observation, to record a further point—the unusual prevalence at an early period of life of the arcus senilis, the significance of which I am not competent to discuss. Those employed in breaking and manipulating pitch, nearly invariably protect their eyes in some way ; and of the various contrivances I have seen, the most effective was a pair of motor goggles mounted in flat leather with the glasses replaced by crape. This material seemed to allow ventilation, did not seriously impede vision, and was of sufficiently close mesh and strength to prevent particles from passing through. Messrs. Keeling and Walker, of Stoke-on-Trent, have prepared for me flat rubber goggles on this plan, in which the crape, as it wears out, can be easily replaced.

The fact that pitch workers protect their eyes is testimony to the discomfort caused by pitch. Cement workers and lime burners, on the other hand, although they are exposed to even more dust than pitch workers, wear nothing to protect their eyes, and declare they have no need of such protection ; and, indeed, statistics somewhat justify this statement, for the percentage of eye injuries among 868 accidents of all kinds which occurred at 26 cement factories during the twelve months ending 31st December, 1914, was only 1·15. Still, cement dust can cause definite injury to the eye, and I have heard of two cases in recent years of serious damage to the sight from this cause. I have no statistics of eye injuries among men exposed to dust of burnt lime, but investigation at factories has disclosed more injuries from flying fragments of limestone before calcination than from lime dust at the later stage. The uncovered part of the sclerotic is, however, in older men found injected and yellow, but there is no tendency to early appearance of the arcus senilis. The risk from lime dust, like that from cement dust, seems to be slight ; even though both by inhalation may occasionally cause perforation of the nasal septum, a condition which I have not found among pitch workers.

Argyrosis, which I have seen, as a pearly-grey discoloration of that part of the conjunctiva not covered by the eyelids, among men employed in polishing silver plated articles on linen wheels, may be included in this group ; but, as no ill-effects result, it must be considered a curiosity rather than an injury.

Class 3. *Injuries following upon exposure to intense light and heat.*—(*a*) *Acute.*—Operatives employed in welding metals are a good example of this group. There are several methods of welding metals by the local application of heat. In one, known as "spot-welding," two articles are placed in apposition between the terminals of an electric current ; a red heat only is obtained, and no effect is produced on the eyes. In another process, the oxy-acetylene flame is used to bring two apposed metal surfaces to white heat, when a shower of incandescent particles is generated. After watching the white-hot flame for some time, the observer finds that he is temporarily blinded, but this effect gradually passes off in about ten minutes. Men will do this work for a short time without any eye protection, but those constantly employed wear goggles with darkened glasses, which appear to afford adequate protection, and I have been unable to find any signs of eye injury or to obtain any history of subsequent ill-effects.

The flying incandescent particles become embedded in the glass of the goggles and render it opaque in two or three months ; and such glass exhibits a curious phenomenon, for particles are found embedded on the inner, as well as on the outer surface. These flying particles must also impinge on the skin of the unguarded forehead and cheeks, and of the hands and forearms, but no signs of any irritation or discolouration has been seen, even after many years of this work.

In a third method—"contact welding"—the ends of two tubes to be welded are placed in apposition, and an electric current is passed along the tubes, which, at the point of contact gradually heat up from a dull-red to white when the process is complete. Operatives protect their eyes with dark goggles, as the white heat is reached, and do not seem to suffer any ill effect. In a fourth process, a carbon electric arc is used which produces an intense white light with a copious stream of incandescent particles. Exposure to this light for only a few minutes sets up conjunctivits accompanied some hours later by the sensation of the eyes being full of sharp gritty particles. What damage might follow prolonged exposure I do not know, but if the skin of the forearm is so exposed for twenty minutes, the exposed part becomes red and acutely œdematous. Men employed upon welding with the carbon arc are always protected with metal hand-screens fitted in the centre with two layers of thick glass, one ruby and the other dark blue, through which they watch their work; and their work-places are screened off from one another and from the rest of the workroom. Recently, yet another method, a modification of the last, the "*quasi* arc," has been introduced, in which an insulated metal pencil takes the place of the carbon candle; less current is used, but an intense white light, similar to that of the carbon arc, is produced, and similar protection is needed.

(*b*) *Chronic.*—Posterior cortical cataract which occurs among glass workers, a malady resembling fibroid phthisis in the slowness of its onset, is the classic example of this group. The subject was carefully investigated in 1907[10] by Dr. T. M. Legge, who, after examining 513 workers employed in the manufacture of sheet glass and glass bottles, found indications of the condition in 30 per cent. of those aged forty years and over. This condition follows exposure, prolonged over twenty to thirty years, to incandescent molten glass or to continual furnace glare in the flattening of glass, and, in the opinion of Sir William Crookes[12], is probably due to heat-rays. Whether prolonged exposure to intense light-rays, such as are given off in the welding of metals, would also cause cataract has not been determined; possibly, as the processes are comparatively modern, sufficient time has not yet elapsed, while the coloured screens supplied to, and used by, the men, although without scientific basis, may be efficient in intercepting injurious rays.

Prevention is to be sought in wearing suitable glasses, and Crookes, after careful research, has prepared different glasses designed for (i) absorption of heat-rays, (ii) absorption of ultra-violet rays, (iii) transmission of luminous rays, and (iv) reduction of glare. Those interested in the subject should refer to the original monograph[12].

First-aid treatment.

What an unskilled workman may be permitted to do to help his injured fellow is an important question. That he will do something must be accepted, and his well-meant, but often misdirected, energy must be known to every ophthalmic surgeon. Snell dwelt on this point, and it requires no repetition. The difficulty is to decide what this eager helper can be instructed to do, which will do good, relieve pain, and do no harm. His services are called for primarily to relieve pain, and, once this has been effected, he will probably be asked to do no more; while, if discomfort returns later when work is over, the sufferer is likely to seek medical assistance. After careful consideration, therefore, the following instructions are now put forward.

Eye Injuries.

Prevention is better than cure, therefore *wear goggles.*

Goggles have saved hundreds of eyes; *thousands* have been lost for want of them.

FIRST-AID.

Apply the eye-drops* to the affected eyeball by means of the camel-hair brush in the bottle.

Do not try to remove any particle which cannot be brushed away.

Tie up with a clean handkerchief or bandage.

Go to a doctor *at once.*

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PENETRATING INJURY TO EYE FROM BROKEN SPECTACLE GLASS.

BY

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Prefatory.

INJURIES to the eye by broken spectacle lenses are admittedly rare. For example, Hans Lauber (THE OPHTHALMOSCOPE, April, 1914), among 150,000 ophthalmic patients, found 5 (or 1 in 30,000) who had sustained this kind of accident. Such accidents, as a rule, are of a description to which people are exposed but exceptionally. For example, in the five cases related by Lauber, the injury resulted from a railway collision, the explosion of an acetylene lamp, a knock against a metal wardrobe-number, a blow from a ball, and a blow from the hoof of a pig, hacked off by the butcher, who had just slaughtered the animal. It has been suggested that glasses may sometimes protect the eyes from injury, either by diminishing the force of a blow or by changing its original direction. A case is known, indeed, where a chip of metal, weighing 6020 milligrammes, had shattered the glasses but left the eye beneath intact (Hirschberg). Lauber believes that spectacles are, speaking generally, more dangerous than eyeglasses, inasmuch as the latter drop off more readily than the former. The question as between framed and rimless spectacles or eyeglasses is more difficult to decide, since those most exposed to injuries seldom wear the rimless goods. Of the ten cases of injury to the eye by broken lenses one was in a child, two in elderly men (Vogt), and the remainder in young men. The case to be related immediately is the only one where the accident has occurred to a woman. The facts are as follows:

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*Eye-drops:—Cocaine, 0·5 per cent.; Hydr. perchlor., 1 in 3,000 in castor oil.

Weigh 95 grammes of castor oil into a flask capable of holding twice the quantity. Add 0·5 gramme of powdered cocaine. Warm on a water bath till dissolved. While the solution is still warm (but not hot) add 1 cubic centimetre of a solution containing 3·3 grammes of mercuric chloride in 100 cubic centimetres of absolute alcohol. Mix the solutions by rotating the flask.

This solution contains in 100 cubic centimetres 0·5 gramme cocaine and 0·033 gramme (=1 in 300) of mercuric chloride; and should be supplied in a bottle from the cork of which a camel-hair brush is pendent in the fluid.

Case.

A woman of 34 years had worn spectacles for the relief of headache for several months. They were gold-filled rimmed spectacles, containing a weak sphero-cylindrical combination, and were used for all purposes. At about 8 o'clock on the evening of February 6th, 1915, the patient stooped to pick up a child's nightgown from the floor of the passage of her house, and in doing so, struck the right lens of her spectacles upon the newel of the staircase. The glass was broken by the impact, and the patient noticed that water and blood came from the eye, which she felt was wounded.

When I saw the woman, about 2½ hours after the accident, I found slight excoriation of the skin of the outer half of the right upper lid and of the parts about the outer canthus. The patient complained of but slight pain. The wounded eye watered freely. Vision, 3/36. Tension – 3. A prolapse of the iris, about the size of a very small pin's head, was present about midway between the centre of the cornea and its outer edge, slightly below the transverse meridian of the eye. The pupil was moderately dilated (cocaine had been used before I saw the patient) and slightly oval, its long axis being directed downwards and outwards. Some little haziness in the lower and outer part of the pupil indicated that the lens had been wounded. The anterior chamber could scarcely be said to exist. There was a good reflex from the fundus of the eye. As regards the uninjured eye, vision was 6/9.

The wounded eye was cleansed, and covered with a pad and bandage, and the patient was put to bed. Atropine sulphate (1 per cent.) and argyrol (15 per cent.) were prescribed for use three times a day.

Progress.

February 9th, 1915.—No pain. The parts do not appear to be septic. There is but little redness of the eye. T.n. Anterior chamber reformed. Pupil well dilated. Tiny adhesion of iris to wound in cornea.

March 2nd, 1915.—Eye waters and is rather irritable, but there is scarcely any redness. Tension *plus* 1. V. 2/60. Former wound of cornea now marked by a small nebula, to the hinder surface of which there is a small entanglement of the iris in the neighbourhood of the pupil. Lens immediately behind the nebula is locally opaque.

April 27th, 1915.—V. 2/24. Tension slightly raised. No redness or irritability of the eye. Small anterior synechia in the lower-outer quadrant of the cornea. Streaks of feathery opacity radiate from wound into the substance of the lens. A view of the disc and retinal vessels can be got with the ophthalmoscope.

Remarks.

That the injury in the foregoing case was of a perforating nature was obvious from: (1) the extremely shallow anterior chamber; (2) the low (—3) intra-ocular pressure; (3) the prolapse of the iris; and (4) the wound of the capsule of the lens. At no time did it become septic. The result when the patient was seen about four months after the accident (June 8th, 1915) was V. 3/36 and No. 20 Jaeger (words). T.n. The eye was free from irritation. Sight can doubtless be improved by operation upon the lens.

In upwards of twenty-five years' experience of hospital and private work, I have personally seen only two other cases where eyes were injured by fractured spectacle lenses. One was in a lad who wore glasses, one of which was broken by a stone flung by another boy. The accident caused a penetrating wound of the cornea, with prolapse of the iris. The protruding iris was excised, and the case did well. In the second case a lad was allowed to play Rugby football with his glasses on. In the course of the game, the lens of one side was broken, but the only consequence as regards the eye was an incised wound of the ocular conjunctiva, which speedily healed.

Contrary to the generally received opinion, A. Vogt (*Centralblatt f. prak. Augenheilkunde*, December, 1912) believes that, after all, such spectacle injuries are not very uncommon. In support of that view he met with five such cases among 700 to 800 eye patients, or in from 0.5 per cent. to 0.7 per cent. This has certainly not been my own experience, and it is in direct opposition to Lauber's figures, quoted at the beginning of this note.

SIDEROSIS OF THE EYE, WITH NOTES OF SEVEN CASES.*

BY

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General Remarks.

SIDEROSIS of the eye is not of very frequent occurrence. It is most commonly the result of the lengthened stay of a particle of iron or steel in an eye, but it may also appear after severe intra-ocular hæmorrhage.

The majority of persons who receive chippings of iron and steel, resort to medical aid immediately after the occurrence of the accident. In many cases the injury is so severe that attention to the eye becomes imperative; but there are a few in which the pain is so slight and the interference with vision so little that the patient is unaware of the seriousness of the condition. Further, there are cases where the evidence of entry into the globe of a foreign body is overlooked by a medical man. Lastly, cases occur where, although the true state of affairs is discovered by the surgeon, he feels that the safest course to pursue is the merely expectant.

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*Read at the Oxford Ophthalmological Congress on July 16th, 1915.

It now and again happens that the point of entry is discovered, and a radiogram reveals the presence of a chip; or it can actually be seen in the fundus through a normal lens, or through a clear portion of the lens.

In such a case, if the accident took place weeks before, and there is no sign of inflammation, with excellent vision, and if, when the patient is put to the giant magnet there is no result, the question arises, will the eye sustain more damage by the mere presence of the foreign body, which may become encapsuled and innocuous, or by making an incision through the sclera, and inserting the armature of the hand-magnet, or even the giant magnet. It does not follow that, even if this latter procedure is undertaken, the foreign body will be removed.

In the old days the dictum was, that an eye with a foreign body in it should be operated on, and if it be removed, well and good; but, if not, the eye should be enucleated for fear of sympathetic disease. Our experience in Manchester does not support this as a rule to be implicitly followed. In fact, if the sclera has been incised, and a negative result only obtained, the question as to the removal of the eye is settled rather by the amount of damage to the globe, than merely by the presence or absence of a chip of metal. The nature of the foreign body is undoubtedly a factor in determining the line of action. If copper or brass, our experience confirms the consensus of opinion, namely, that a desperate inflammation will, sooner or later, take place and destroy the eye. On the other hand, the eye may tolerate the presence of iron or steel even for years.

It is at once evident that siderosis practically can arise only in eyes injured by relatively small fragments of metal; otherwise, pain and inflammation cause the patient to resort to advice.

Now the eye in certain positions can tolerate the presence of such iron or steel particles without siderosis arising, as, for instance, in the conjunctiva, in the sclera, and in the cornea. In the last position, it is true, some rusting of the surrounding tissues often takes place very shortly after the impact of a particle, but even so, the brownish pigmented area does not spread to any great extent. Large numbers of the eyes of men working in the iron or steel trade present small brownish permanent opacities of the cornea.

A small chip may get through into the anterior chamber and lie loose on the iris without causing any irritation or at most bringing about slight attacks of iritis. I have had no case in which the foreign body has lain free in the anterior chamber long enough to cause siderosis, except, possibly, No. 4, Joseph D.

That the iris can tolerate the presence of a chip of iron is well illustrated by the case described by Dr. T. Milnes Bride, of Manchester, in THE OPHTHALMOSCOPE for June, 1914, in which a chip of iron was lodged in the tissue of the iris for seven or more years. The eye appeared to be perfectly healthy, except for one posterior synechia, and had normal vision, but was subject to repeated attacks of iritis. The foreign body proved to be magnetic, and was successfully removed. No siderosis was produced, and for this there may be three explanations:—1st, because of the free drainage of fluids from the anterior surface of iris into the anterior chamber and away by the canal of Schlemm; 2nd, because it was completely encapsuled; and 3rd, it may be that steel is different from ordinary iron in its chemical effects on the tissue.

If a chip has penetrated the eye and is completely embedded in the sclera, no siderosis is likely to appear.

The crystalline lens is tolerant of a foreign body, and certainly iron or steel may remain in it for a long time without diffusion of metallic particles.

The only other positions to be considered are the vitreous and the retina, ciliary body and choroid, and it would appear that in any of these siderosis may arise.

Here, in addition to the clinical evidence, experiment comes to our aid. Leber, in 1881, introduced foreign bodies into the vitreous of rabbits. Gold and glass caused no reaction. Iron, according to him, is acted upon by the carbonic acid of the tissues, and forms the soluble carbonate, which is diffused through the fluid, and becoming oxidised in the cells, is deposited as hydrated oxide or as albuminate. von Hippel later repeated the experiments, and found the anterior chamber and the lens tolerant, but when iron was introduced into the vitreous, degenerative changes always took place in the retina. Slight or absent encapsulation of the fragment seems to be against toleration, but within certain limits, the size of the chipping appears to be of no moment.

It was in 1890 that Bunge first designated the condition as "Siderosis."

Several surgeons have demonstrated the presence of iron in the tissues by the Prussian blue method.

C. J. Kipp, in a paper read at the Annual Meeting of the American Ophthalmological Society in 1906, says that he could discover no difference whatever in the discolouration of the iris when produced by the presence of a foreign body or by extensive hæmorrhage into the vitreous. He published details of four cases, and stated that the discolouration remained in all after the extraction of the iron, as long as they were under observation.

The length of time required to produce visible siderosis varies considerably. In all Kipp's cases at least six months had elapsed, but Natanson observed signs of siderosis as early as two months after entry; yet it does not appear in every case, as follows from the statement by Kipp, that he had observed one in which metal had been present for twenty-five years without siderosis. He considers that the thickness of the coating of the metal with new tissue seems not to have much influence in this direction.

J. V. Paterson described two cases in a paper "on Rust Staining of the Ocular Tissues," which appeared in the *Edinburgh Hospital Reports* (1900, p. 343). Two other cases are quoted in a paper by Angelo Casali, published in the *Annali di Ottalmologia* for 1910 (p. 572).

That siderosis is a rare condition may be gathered from the fact that during the fifteen years ending 1913, 458,496 new patients were admitted to the Royal Eye Hospital, Manchester. Of these 111,371 were accidents, and yet one can find only thirteen cases which were diagnosed as "siderosis" in the out-patient department register. The number, thirteen, is certainly short of the actual total, for others have been diagnosed after they have been admitted into the Hospital.

During these fifteen years, on the average, I consider that about one-seventh of the total new patients have been under my own care, and on going through my in-patients' notes, I discovered only 6 in the fifteen years, and another, who is now an in-patient, making a total of 7.

The periods which had elapsed between accident and admission to hospital were respectively two years, seventeen months, twelve months, eight months, eight months, fifteen months, and, lastly, nineteen years.

The clinical appearances consist chiefly in a rusty-brown discoloration of the iris, and may present a marked contrast to the iris of the other eye, if both were originally blue. Occasionally, there is mydriasis, as in one of my cases (No. 6). The lens in the later stages becomes opaque, and often presents a yellowish-brown tinge, but the characteristic marks are the presence of deeper brown opacities towards the periphery in the subcortical zone.

Such an eye may be perfectly quiet, or it may show signs of uveitis in any degree of severity. The history is of great importance. Care should be taken to find the evidences of perforation.

I now give particulars of my cases:

Cases.

1. Fred Collier. Male. Age not recorded.

Admitted September, 1902.

Two years ago, struck in eye by chip of steel. Was told "nothing in" by medical man. No inflammation followed. Formerly had blue irides.

Condition on admission.—

R. slight conjunctival injection. Small corneal scar, central. Pupil reacts.

Iris greenish-brown. Small hole in it. Lens opaque.

In O.P., some weeks before, the fundus could be seen through haze, but no lesion in it could be found. Now no red reflex. V.=fingers. T.n. Projection good.

September 2nd.—Ext. R.c. Iridy. Magnet applied. No result.

Troublesome recovery. Iris remaining of bad colour.

October 2nd.—Eye quiet Cortex below. V.=fingers.

November 16th.—R.V. c.+12 D. sph.=6/6 partly+16 D. sph.=J.1.

2. Harold Field, æt. 16.

Admitted January 21st, 1904.

Accident August 26th, 1902. Came to Royal Eye Hospital, and was admitted same day with cut cornea and iris with traum. cat. (under Dr. Little). He stated eye remained quiet, and could see something with it up to twelve months ago, when it began to fail. Removal of eye advised in 1903, but patient stayed away to avoid operation.

Condition on admission.—

R. Scar in cornea, radiating up and in. Iris adherent to base. Cornea shows diffuse red rust coloured haze. Iris rusty. Some pigmented capsule outer side of pupil. Operative coloboma above. No red reflex. V.=hand. Projection bad below, and to outer side.

L. 6/6 and J.1. Normal.

January 22nd, 1904.—Enucleation.

3. E. C. Hurst, æt. 19. Male.

Admitted August 30th, 1905.

History:—L. Div. strab. Twelve months. Thinks got something in left eye twelve months ago when walking. Noticed L. failing nine months only. Employed for last four or five years on farm; previously in foundry.

R. 6/6, J.1. Normal.

L. Div. strab. Anterior chamber deep. Small corneal scar down and out, with hole in iris immediately behind. Iris rusty. Lens opaque and tinged yellowish-brown. No red reflex. V.=P.l. Projection good. T.n. Radiogram showed foreign body, 3 mm. below, 7 mm. behind, 2 mm. outer side centre of cornea.

September 4th.—Section above. Iridy. Flat, yellowish-brown lens expressed whole. No result with giant magnet. At operation optic disc and localised vitreous haze could be distinguished.

September 19th.—L.+11 D.=6/12 p.+18 D.=J.1.

September 21st.—Eye perfectly quiet.

4. Joseph D., æt. 25. Male.

Admitted April 20th, 1906.

Struck on R. eight months ago, August 4th, 1905. No inflammation until night before admission. Foreign body not in anterior chamber at noon, but patient felt a pain after discovering it in anterior chamber. No corneal scar visible. Black mass in anterior chamber below. Pupil medium, sluggish. Iris stained brown. Media hazy. No fundus details. White streak to be seen somewhere behind lens.

L. 6/6+1 D.=6/6 J.1. Fundus normal.

April 20th.—Section of cornea down and out. Hand-magnet applied but no presentation. Wound enlarged, and foreign body withdrawn.

April 23rd.—Iritis. Vitreous exudate below less marked.

May 3rd.—Eye quiet. Anterior chamber good. Iris rusty. Disc seen through slight haze. Scar at macula. Concentric white line in lens towards post surface below. Strands of opaque vitreous at extreme periphery below. +5 D. sph.=J.16.

5. Moses E. Draper, æt. 38. Male.

Admitted March 3rd, 1909.

Eight months ago, patient thought he got foreign body in left eye. Simply experienced a pricking sensation. No treatment. Two months ago, noted sight going dim, and there has been gradual failure since.

R. 6/9. No Hm. J.1. Normal.

L. Active pupil. Iris brownish, lens opaque, no red reflex. V.=shadows. Projection good. T.n

March 14th.—Radiogram negative.

March 18th.—Giant magnet negative.

Ext. L. without iridy. Cornea noted slightly hazy. Uneventful recovery.

March 19th.—L.+9 D.=6/18+14 D. sph.=J.14.

6. Joshua Bamford, æt. 35. Male.

On June 5th, 1911, sustained what was diagnosed as an abrasion of the right cornea.

Admitted September 2nd, 1912. Sight found to be poor in right four weeks before on covering left eye.

R. Small scar in centre of cornea. Pupil dilated, regular, and active. Iris discoloured brown. At inner periphery of anterior lental capsule a few fine brown dots. Fundus normal. V.=6/6+1 D.=6/6 J.1.

L. Normal. V.=6/6+1=6/6 J.1.

September 3rd.—Giant magnet applied. No result. In dilated pupil no fundus lesion to be found. Radiogram seemed to show two small foreign bodies near the front of the eye, but none discernable by ordinary examination.

Re-admitted September 29th, 1913. R. Cornea clear. Anterior chamber shallow. Mydriasis, Lens opaque. V.=fingers. Projection good. L. Normal.

October 7th, 1913.—Ext. R. without iridy. Hand-magnet applied with negative result.

October 20th.—Pupil round. Much cortex. V.=shadows.

7. Richard Rudd, *æt.* 44. Admitted Manchester Royal Eye Hospital on May 12th, 1915.

History.—In 1887, when *æt.* 15, he sustained an accident to his left eye. There was a small wound at the outer margin of the left cornea. The lens was clear, and in the fundus, at the outer side of the macula, there was a small whitish patch, which appeared to be a scar in the sclera, as if a foreign body had passed right through the globe and out at that point. Six months later, the sight of the injured eye was J. 4. No operation was undertaken.

He was then under the care of Dr. C. E. Glascott, and remained so until 1906. In 1888, when *æt.* 17, the sight of the left eye rapidly failed. The iris was discoloured, the anterior chamber shallow, the lens opaque, and projection bad, with mere perception of light. The eye was enucleated. At that time the vision of the right eye was J. 1.

In 1896, a fortnight after marriage, he was struck in the right eye by a chip of metal. There was a small sclero-corneal wound in the 8 o'clock position. No wound of the iris. The lens was clear, but there was a slight opacity in the vitreous behind the lens. In the fundus a whitish patch of exposed sclera was visible, with a small hæmorrhage below, well to the outer side of the macula. Ten days later, a dark broad line was noted in the centre of the white patch. It is curious that this accident was practically symmetrical with that to the left. After two months, the vision had gone down to 6/60 and J. 19.

There was more exudation round the metal, which had been visible, and partly embedded in the sclera, and distinct vitreous opacities had developed.

Under treatment, however, the eye improved.

He was re-admitted on May 9th, 1898, and the cornea was noted to be clear, the pupil fairly wide: a ring of pigment on the anterior capsule was present, but no posterior synechiæ Small disseminated opacities in the lens were noted, and in the choroid below a dark line and near it a white line were observed, both of them short and broad. The vision was 6/18, partly. No operation was undertaken.

He again became an in-patient on October 3rd, 1898. The vision was 6/60 and J. 19. A large circular opacity in the lens had appeared, and some brown marks growing peripherally round it were observed. Also, close to the outer side of the ring at the periphery of the lens, another opacity was in evidence.

On March, 1906, he again entered the hospital with complete cataract and good projection. A radiogram taken showed the presence of a foreign body.

On the 16th of that month an iridectomy was done inwards, and on the 23rd the tension was somewhat raised.

Later, on the 4th May, the cataract was extracted. Four days later the tension was full.

On May 16th, V. = J. 16 with + 20 D. sph.

On September 7th, 1906, a discission of capsule was performed, and on the 12th, the right c. + 9 D. sph. with + 2·5 D. cyl. 6/12, and with + 15 D. sph. and the same cyl. J. 1 was read easily

After this, he continued at business; but in the early part of May this year, he presented himself, stating that his vision was failing, and this was evidently due to a secondary glaucomatous attack, for which, on May 13th, a trephine operation was performed above.

On June 15th, 1915, the vision of the right eye, with + 8 D. sph., was 6/24, and the tension remained normal for some weeks, but at the beginning of July, it had risen once more, and remained full, even under the use of eserine.

On July 14th it was difficult to know that a trephine operation had been done. The tension was +1. The cornea was a trifle hazy with some disturbance of the epithelium. Through the coloboma, a pale cupped disc and a large area of choroiditis were visible. The vision with +18 D. sph. = J. 6. I consider the rise of tension was due to presence of vitreous in the anterior chamber.

On July 15th a paracentesis was performed, but the tension rose again the next day.

On July 17th, after cocaining the eye, I put in a speculum and was about to re-trephine, when the patient squeezed his lids together, and the whole of the cornea, which was evidently very thin, bulged alarmingly forward. At first I thought the appearance was due to an enormous bulla extending over the whole of the cornea, and this view seemed to be confirmed by some of the epithelium becoming loose and hanging in shreds. The tension went down to −3, owing, I thought at the time, to reopening of the original trephine hole. No further interference was undertaken. Next day the tension was again up and remained so. The cornea appeared in normal position again. I therefore decided to attempt an operation under general anæsthesia.

On July 23rd, after inserting the speculum, I was raising a conjunctival flap when, without any movement on the part of the patient, once more the whole cornea bulged markedly forward and vitreous was observed coming through the coloboma into the anterior chamber. The tension fell at once and trephining was out of the question, but as the condition of the eye was desperate, I determine to perform a sclerectomy. A narrow keratome was passed under the conjunctival flap into the anterior chamber and fluid vitreous began to escape. The posterior lip of the wound was drawn up and out by a sharp hook and a piece removed. More vitreous escaped, and the globe collapsed partially. The conjunctiva was sewn into position, and it was hoped that by these means the high tension, which would undoubtedly destroy the sight, would be relieved. Such hopes have not been realised. The patient has suffered much pain; the cornea has returned to its ordinary position, but its surface is somewhat dull. The anterior chamber is deep, and its contents are faintly straw-coloured but clear. The tension is again + 2.

July 31st.—Pain intense. Patient somewhat delirious. Ether. Conjunctival flap raised below, and incision through the sclera well back, down and out. A small sclerectomy performed out of one lip of the incision.

August 18th.—Eye painful. Faint yellowy tinge of contents of anterior chamber. T. full. V. = hand.

Comments.

Although I have taken considerable trouble, I have unfortunately not been able to get any of the first six cases described above to return for recent examination.

The last case, however, is particularly interesting in that a small foreign body entered the periphery of each cornea down and out, without wounding the lens, each eye revealing a definite scar at the back. Siderosis appeared in each. In the left eye such violent inflammatory changes took place about eighteen months after the entrance of the foreign body, that the eye had to be removed. The second eye has tolerated the presence of a chip of iron for nineteen years, and in it the amount of siderosis is not great; the difference probably being that in the right eye the fragment is entirely embedded in the sclera, whereas in the left, it probably projected through the choroid into the vitreous.

In no case was so-called "keratitis punctata" noted, but Rubert, of Kiew (*Archiv für Ophthalmologie*, Vol. LXXVIII, February 21, 1911), states that such deposits may arise, when iron is present in the eye, sometimes from iritis alone, *i.e.*, without any affection of the ciliary body.

In five of my cases the lens had become opaque, and was removed by operation. In one only was a foreign body removed, and in one the whole eye was enucleated—not including the enucleation done in Rudd's case (No. 7).

It is a pity that I have been unable to trace the cases; for I can shed no light on the question as to whether the staining of the tissues clears after removal of the foreign body. Rogman, of Gand, relates one case in which this occurred (*Annales d'Oculistique*, janvier, 1905). After a search through the literature, he was able only to mention cases by Leber, von Hippel, and Cramer, which will be found on page 34 of the original communication.* The references, given by him, are quoted below :—

Leber.—" Beobachtungen über die Wirkung ins Auge eingedrungener Metallsplitter." Graefe's *Archiv für Ophthalmologie*, Vol. XXX, part 1, p. 256, 1884.

von Hippel.—" Ueber Siderosis Bulbi." Graefe's *Archiv für Ophthalmologie*, Vol. XL, part 1, p. 174, 1894.

Cramer. – " Ein Fall von völliger Heilung der Verrostung des Augapfels." *Klin. Monatsbl. für Augenheilkunde*, July, 1902, p. 48.

A CLINICAL STUDY OF FIFTY-FIVE CASES OF INTRA-OCULAR RETENTION OF FOREIGN BODIES, WITH RESULTS TWO YEARS AFTERWARDS.

(*Continued.*)

BY

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If it has been decided to incise the eyeball and to allow the inflammation to subside before enucleation, I think the operation should not be delayed over a month, in view of a case which I saw last year at the Glasgow Eye Infirmary in a patient who had had a piece of metal removed by the magnet. The eye went on to panophthalmitis, and the resultant stump was not removed until two months after the original injury. Sympathetic ophthalmia of a severe type developed in the second eye, and left it with a visual acuity of 4/60. The case is interesting, as it is a well-known fact that sympathetic ophthalmia following panophthalmitis is rare ; in fact, some authors state that it never occurs under those circumstances.

Second period : With regard to the care of the patient after leaving the operating table, I need not say much, because the same measures are adopted as after any other eye operation.

Dressing of the eye morning and evening, or oftener if necessary, beginning twelve hours after the operation, with douching of the conjunctival sac and instillation of atropine are carried out. For the relief of pain, which is usually due to iridocyclitis, various measures can be used—hot fomentations, dry heat, leeching, drugs in the shape of aspirin, calomel and opium pill, etc., with rest in bed and regulation of the bowels.

Subconjunctival injections of perchloride or bicyanide of mercury (1 in 3,000 or 4,000 twice weekly, 1 c.c. at a time), are useful in these conditions of iridocyclitis. Solutions of sodium chloride of increasing strengths, beginning with 2 per cent., have the same effect. What I would point out is that the advisability of the continuance of these, as of other conservative, measures, will depend on the condition of the eye at the end of, say, three weeks, and here we come to the most important question with regard to the after-treatment of these conditions, *viz.*, the question of enucleation in the event of the eye not making any definite progress towards recovery at the end of that time.

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* In a case reported by de Schweinitz (*Ophthalmic Record*, March, 1909, p. 155), both the spots on the capsule of the lens and the discolouration of the iris had disappeared three and one-half months after removal of a particle of iron from the eye.—EDITOR.

Each case must be considered on its merits. But in the course of my studies I have observed certain pathological appearances in eyes from which a foreign body has been removed, which should cause one to advise enucleation at an early date. I speak of the condition of the eye from the second or third day until the end of the third or fourth week.

The following are the special clinical features to be looked for:

(1) A muddy, injected iris, with perhaps exudate in the pupillary area, and, maybe, hypopyon. I have found that keratitis punctata is conspicuous by its absence after a recent injury of this sort. It is more likely to be present at a later stage of the inflammation. These features indicate the presence of a plastic iridocyclitis, and I would advise enucleation with this condition of affairs present, because this class of case, like 2 and 3, is more likely to end in a soft and shrunken eyeball than to go on to panophthalmitis, and is especially liable to be followed by sympathetic ophthalmitis.

(2) By oblique illumination, a definite yellow reflex is obtained from the vitreous. This is usually accompanied by the foregoing signs of iridocyclitis, and indicates a plastic or suppurative uveitis. This I have found frequently follows those cases where a "vitreous track" is present at the commencement, and also in those small punctured corneal wounds where the foreign body is lodged in the back of the eyeball. This again, like (1), will most likely end in a sightless soft eye, and ultimately in phthisis bulbi, with a risk of sympathetic ophthalmitis.

(3) This type is perhaps seen at a later stage than (1) and (2). An eye at first sight seems to be improving, but on closer inspection, the iris looks somewhat atrophic, the vision being practically *nil*, and, on feeling the tension, which tends to be below normal, the patient starts back when pressure is made on the ciliary region. In these cases there are often sharp attacks of pain in and around the eye, especially at night.

In all these three types of pathological eye I advise early enucleation, chiefly because of the risk of sympathetic mischief if the eye is left in, and, later, if sympathetic ophthalmia does not follow, the eye becomes useless as far as vision is concerned, and, later on, will probably end in a shrunken eyeball, liable to attacks of pain and inflammation, besides being an unsightly organ. In a workman who is earning his daily bread by the use of his eyes, where the æsthetic effect of an artificial eye does not matter so much, it is criminal to dally with an injured eye of this sort, and anyone who has seen a case of severe sympathetic ophthalmia, with its consequent results, will not hesitate for a moment to advise enucleation with this condition of affairs present.

I have no doubt that many of these eyes were sacrificed where, if they had been retained, perhaps they would have quietened down in a few months, but with the risk of sympathetic in the background, I do not think that one should have any further scruples on that point. If we had any certain guide to tell us whether sympathetic would develop or not, then the circumstances would be somewhat different. I shall speak later of recent work on the pathology of sympathetic ophthalmia which throws, at least, some further light on that obscure disease, but, until we have something even more definite to go on, I think the only safe attitude to be adopted is that which I have outlined above.

This brings us to the question of removal of the eye in these cases. In every case of removal, enucleation was performed.

I think that, following a penetrating wound, enucleation should always be done, owing to not a few recorded cases of sympathetic ophthalmia following evisceration. If the surgeon desires to employ a glass globe to secure a more moveable stump, then I do not see any objection to the method of implanting the globe in the capsule of Tenon, as recommended by Ramsay,[12] catching up the muscles by the suture before cutting them, and tying the muscles and conjunctiva over the globe after insertion.

Between these clinical types, which I have mentioned above as indications for enucleation and those which have given no anxiety from the first, the latter usually being those where the foreign body has been lodged in the anterior part of the eyeball, are cases which must be dealt with according to the individual circumstances ; always remembering that, other things being equal, if the eye has useful vision—by "useful vision" I mean an eye which is not reduced to counting fingers, but which can make out objects at the other side of the room—an effort should be made to preserve it.

It is in this connection that subconjunctival injections of bicyanide of mercury, *plus* the usual local treatment, are useful, often apparently leading to rapid improvement of the eye. In the carrying out and continuation of this treatment I would pay special attention to the following points : ciliary injection and tenderness, pain, appearance of the iris and vitreous, tension and vision of the eye. If these are not satisfactory in a doubtful case, after five or six weeks from the date of injury, then the question of the removal of the eye has to be considered.

I may here quote Hepburn[13], who says, "a well-balanced judgment in dealing with all cases of injury, in order to avoid excision of the eye, is as hard to acquire, in my opinion, as in deciding the question of excision itself."

Sympathetic Disease.

After three or four weeks, if it has been decided not to enucleate, the possibility of sympathetic ophthalmitis must be taken into account, for it is about this period, that is, from the third to the twelfth week, that sympathetic disease is most liable to occur.

After a study of my series of cases, I am inclined to agree with the late Sir Henry Swanzy in believing that sympathetic irritation and sympathetic inflammation are two entirely different conditions. Many of these cases suffered from watering and irritation of the second eye, but there was no sign of sympathetic ophthalmia at the time or subsequently. Swanzy[14] points out that sympathetic irritation may last an indefinitely long time without being followed by sympathetic ophthalmitis. Further, although some sign or signs of sympathetic irritation often precede the onset of sympathetic ophthalmia, yet in many cases anything of the kind is wanting. In view of the latter fact, it is wrong to postpone the prophylactic enucleation until sympathetic irritation shows itself.

If the patient complains of irritation of the healthy eye, his statement is not to be ignored, the special points to be looked for being the presence or absence of ciliary injection, keratitis punctata, a disordered state of the accommodation, or an inactive pupil. The vision of the healthy eye should also be taken periodically, or when any complaint is made—hence the importance of having estimated the vision when the patient first presented himself, and comparing it with the now existing vision. An examination of the visual field of the healthy eye is also useful in these cases, since a contraction is sometimes one of the first signs of sympathetic ophthalmia (See case 33).

Any spindle-shaped enlargement of the blind spot of the eye should also be specially looked for (See case 33). This is described in Maitland Ramsay's[15] book. He points out that normally, when tested by a Bjerrum's screen, one-third of the spot is above the horizontal meridian, drawn from the fixation point, and the vertical breadth of the spot is to the horizontal breadth in the proportion of 6 to 4. Ramsay describes a case of sympathetic irritation where the spot became spindle-shaped, the corresponding proportion being 12 to 4. This was accompanied by a marked congestion of the disc and of the retinal vessels. Enucleation of the exciting eye, which showed the characteristic "sympathetic infiltration of Fuchs," was followed by a gradual recession of the spindle-shaped blind spot to the normal. This condition is also described by J. Rowan and A. W. M. Sutherland[16]. In one of my two cases where sympathetic ophthalmia developed (case 23), there was definite spindle-shaped enlargement of the blind spot, and the attack of sympathetic ophthalmitis took the form of marked optic neuritis chiefly. A few of the cases, where the patient complained of irritation of the uninjured eye, showed only a tendency to the spindle-shaped enlargement of the blind spot, and some hyperæmia of the optic disc, but nothing so definite as the case mentioned. As Ramsay suggests, this phenomenon is probably due to acute congestion of the optic disc, and is a danger signal which usually disappears on removal of the exciting eye.

Sympathetic ophthalmitis, although usually of the nature of plastic uveitis, may commence as an optic neuritis. Indeed, if the case is not severe, and the media are sufficiently clear, one can often make out a definite optic neuritis in addition to the iridocyclitis which is present, and this raises the question whether optic neuritis is not always present, although it cannot be made out owing to the hazy media, or the exudate in front of the lens caused by the obvious plastic uveitis.

To recapitulate: when a patient makes any complaint of the second eye, and, in fact, as a matter of routine, an examination should be made, looking specially for any signs of iridocyclitis, optic disc or retinal vessel congestion, contraction of the visual field, spindle-shaped enlargement of the blind spot, loss of visual acuity, and paresis of accommodation, due to early impairment of the ciliary muscle.

It is impossible to leave this subject without mentioning what appears to be an important factor in the early diagnosis of sympathetic ophthalmitis, *viz.*, a leucocytic blood count. It is only within the last few years that Gradle[17] published the results of his study of the blood count in perforating injuries of the eye. Later, Price Jones and Browning[18] described an increase in the large mononuclear cells of the blood in cases of sympathetic ophthalmitis. As has been pointed out by Coats[19], "on the analogy of the blood condition in syphilis, this may indicate a protozoal infection as the cause of sympathetic ophthalmitis."

As another point in favour of this view, Coats suggests "that the incubation period of sympathetic ophthalmitis is unlike that of most ordinary bacterial infections, but in the majority of cases is closely similar to that of syphilis. Still another point of resemblance is the occasional faculty which the noxa of sympathetic possesses, of remaining latent over a prolonged period, and of then breaking out into activity, like the tertiary stage of syphilis. On the other hand, the histological structure characteristic of sympathetic ophthalmitis, so well described by Fuchs,[20] is more nearly allied to that of the bacterial infection, tuberculosis, than to that of the protozoal infection, syphilis. Tuberculosis is an example of a bacterial infection with a prolonged incubation period, so that with regard to these points, the evidence for a bacterial *versus* a protozoal infection, is inconclusive." Coats mentions that, as a logical outcome of these speculations, Price Jones and Browning recommend the treatment of sympathetic ophthalmia with salvarsan, and describes three cases where this was tried. In the first, a severe case, it had practically no effect; but there was evidently some improvement in the other two, especially after a second injection.

More recently, Browning[21] points out that Gradle's original results were of little value, because he simply differentiated between the polymorphs and mononuclears. Browning claims that this method quite masks the chief point of the count in sympathetic ophthalmitis, *viz.*, the increase in the large mononuclears. He found that in practically every case of sympathetic ophthalmitis there was a typical blood picture. There was a marked increase in the number of large mononuclear leucocytes, and some increase of the lymphocytes, whilst the polymorphs were diminished. The total white-cell count did not vary much beyond the normal limits. He puts the average blood count in sympathetic ophthalmia as follows:—

	Sympathetic.		Normal.
Polymorphs	54 per cent.	...	60 to 70 per cent.
Lymphocytes ...	28 ,,	...	20 ,, 23 ,,
Large mononuclears	16 ,,	...	2 ,, 5 ,,
Eosinophiles... ...	2 ,,	...	2 ,, 4 ,,
Mast cells	—	...	— ,, ·1 ,,

He also points out the striking similarity between blood counts in certain protozoal diseases (malaria, syphilis, anchylostomiasis—especially marked out by the eosinophilia—trypanosomiases, kala-azar) and sympathetic. As the result of this similarity of blood count, and the similarity which I have referred to in Coats' paper, a large number of cases have been treated with "606" at Moorfields Hospital, and not only have the results been encouraging, the eye condition being at once relieved, *but the blood count approached to normal.*

Browning next proceeded to determine the time-interval between the perforating injury and the appearance of a pathological count, and also to determine whether the count could be used for an early diagnosis, or prognosis of sympathetic ophthalmitis, in cases of perforating injuries of the eyes. As the result of his investigations, he found that the blood count showed marked changes at a time when there was still no other evidence pointing to the probable onset of sympathetic ophthalmitis. He points out that in doing periodical blood counts in a case of sympathetic ophthalmitis, the count may remain normal for weeks, and then show all the signs of a typical protozoal count.

From this fact it is obvious that a normal blood count does not exclude the possibility of sympathetic ophthalmitis intervening. He was of opinion, however, that a positive count, namely, an increase of the large mononuclears, is very ominous. As it is probable that in sympathetic ophthalmitis a systemic infection has already occurred before the pathological eye changes appear, the blood count may afford a method by which this infection may be demonstrated before the sound eye becomes obviously diseased. He describes a case to illustrate this point.—The patient had a punctured wound of the left eye with retention of a small chip of steel, which was removed by the magnet the same day as the accident (September 12th).

Blood count:

		Poly'ms.	Lymphs.	Large Mon.	Eosino'les.
September 20th	...	69%	23%	5%	2%
,, 27th	...	71%	20%	6%	3%

These are normal, but after this, we find a change, especially in the large mononuclears:

	Poly'ms.	Lymphs.	Large Mon.	Eosino'les.
September 28th ...	62%	20%	18%	—
,, 29th ...	59%	28%	10%	2%

At this date the right eye was noticed to be sensitive to light.

	Poly'ms.	Lymphs.	Large Mon.
September 30th ...	63%	12%	24%

At this stage the damaged eye was removed.

	Poly'ms.	Lymphs.	Large Mon.
October 2nd	72%	14%	12%
,, 3rd	71%	18%	9%
,, 4th	62%	25%	5%

It is to be noted how the blood count gradually dropped to normal after the removal of the exciting eye.

Browning's results were supported by Sattler at the Heidelberg Congress; and Roller, working under Fuchs, came to the conclusion that the blood picture was a valuable diagnostic aid.

There is another means of service in the diagnosis of sympathetic ophthalmitis following enucleation of the injured eye, namely, by the histological examination of the injured eye.

These changes were first described by Fuchs[22] as "sympathetic infiltration." The cells taking part in the infiltration are the same as in the giant-celled tubercle system—lymphocytes, endothelioid cells, and giant cells—but made up together in irregular strands and tracts, rather than disposed with any regularity, as in the tubercle system. The distribution is more or less characteristic—in the posterior layers of the iris, in the outer part of the inner zone of the ciliary body, and in the outer layers of the choroid. Fibro-plastic exudate in the vitreous is the exception.

Coats' experience[23] after examination of these eyes is as follows:

(1) The most characteristic feature of all is the wide-spreadness of the inflammation, usually the whole of the uvea being involved, the choroid being scarcely ever free. In this connection sympathetic stands out in marked contrast to infective iritis, in which the severe inflammation of the iris is often associated with total exemption of the choroid. The patchiness of the infiltration is also very characteristic of sympathetic, at least in the early stages.

(2) Cases of true sympathetic undoubtedly occur which could not be diagnosed by the histological character of the infiltration alone, in which the exudate in the uveal tract consists chiefly of plasma cells and lymphocytes. He had met with these cases chiefly in the sympathising eyes.

(3) On the other hand, if the changes described by Fuchs are present in typical form and distribution, there is scarcely any possibility of error. Practically, the only source of confusion is tubercle, to which the resemblance of the histological picture may be very great. Again, a few cases of idiopathic iridocyclitis with the histological changes of sympathetic have been described by continental writers. They must be very rare. In both these exceptions, however, the clinical history excludes the possibility of error.

Where there is a history of injury, therefore, and where the changes described by Fuchs are typically present, the diagnosis of sympathetic may be made with the utmost confidence.

To illustrate this point, Coats cites three cases where sympathetic ophthalmitis followed enucleation of the "first" eye, and where that eye presented the sympathetic inflammation to a marked degree, and where the likelihood of sympathetic was suspected, and later confirmed.

Since I had two cases only of sympathetic ophthalmitis in my series, I did not have much opportunity of following this work closely.

The first case (No. 9) had a large piece of steel embedded in the back of the right eyeball, and repeated attempts to remove it by the magnet failed. Enucleation was advised, but the patient would not consent to this until a month after the injury. The operation was then done, and the patient was dismissed from Hospital. One month later, *i.e.*, two months after the original injury, the patient began to complain of pain in the left eye, and irritation in a strong light. The pupil was active and dilated well and equally under homatropine, showing no adhesions. A few spots of keratitis punctata only were present, but there was definite optic neuritis, and the vision had fallen from 6/6, as taken at the time of the injury and at different periods subsequently, to 6/12. He was re-admitted to Hospital, and an examination of the condition of his blood was made. The results are appended:

Polymorphs...	46 per cent.
Lymphocytes	29·8 ,,
Large hyaline cells	21·2 ,,
Transitional	2 ,,

At that time I noticed that there was a relative lymphocytosis and a fall in the polymorphs. Now that Browning has published his results, one can see that, in this case there was a distinct specific increase in the "large hyaline cells," or, as Browning prefers to call them, "large mononuclears."

This eye did well with large doses of salicylates, *plus* local treatment. The vision, at one time 6/36, improved ultimately to 6/6 and J.1. The swelling of the disc, once 3D., subsided.

In the second case (No. 39) the attack of sympathetic came on eight months after the original injury, and the injured eye was enucleated one month after the injury. Here the type of sympathetic was of the nature of a severe plastic iridocyclitis, and progressed despite treatment, until vision was reduced to hand-movements. A blood count was made when this patient developed sympathetic ophthalmitis, but, although done on two separate occasions, I could find little departure from normal, such as had been present in the previous case. In this case the delaying of enucleation was due to the fact that, when the patient was first admitted, no X-ray plate was taken before the magnet was applied, and a small spicule of metal was extracted by the magnet. Naturally, it was thought that the foreign body had been removed in its entirety. It was only 23 days after the date of the injury that an X-ray plate was taken, when a large piece of metal was localized behind the eyeball. This, although an isolated case, illustrates the great importance of taking an X-ray plate before applying the magnet. As there was only one wound in this eyeball, the probability was that a ragged piece of metal had entered the eye, and that a small spicule of it had become detached before it penetrated the posterior part of the globe. If a plate had been taken before applying the magnet, the two pieces of metal would probably have been shown on the plate. Certainly, in any case, the size of the piece of metal, extracted on the first occasion, would not have corresponded with the X-ray picture, and would have put one on guard and caused one to advise earlier enucleation.

I consider these cases, where the metal has perforated the posterior part of the globe, dangerous, as far as sympathetic disease is concerned. Both of my cases of sympathetic ophthalmitis occurred when the metal was in this situation, although both eyes were enucleated as late as one month after the date of the injury. The ultimate result of the second case, when the vision of the remaining eye was reduced to hand-movements after a distressing and painful illness, now slightly better, now worse, for several weeks, each attack causing further damage to the eye, is quite enough for anyone who has seen such a case to have no qualms of conscience in advising early enucleation under the circumstances.

Since these two cases, I have taken blood counts from several other cases of perforating injuries, but, as the results were by no means uniform, more reliance was placed on early excision of the eyeball on naked-eye inspection. Having no more cases of sympathetic ophthalmitis, I lost interest in the subject; but, in the light of Browning's recent researches, supported by the competent observers whom he mentions in his communication, I am convinced this is a subject which should not be neglected.

It should be said that these recently published results are by no means generally accepted, but in view of the obscure pathology of sympathetic ophthalmitis, I think that any light on this subject, however small, will be accepted gladly.

I may perhaps be pardoned for having rambled into the pathology of sympathetic ophthalmitis, but the points I have mentioned have an important bearing in the after-treatment and prognosis of these cases.

The only logical outcome is:

First, to make a differential blood count in all cases of perforating injury to the eyes at regular intervals, and where a positive blood count—by "positive" I mean a relative increase in the large mononuclear leucocytes—is found, to take steps to prevent the occurrence of sympathetic ophthalmitis by early enucleation, provided that the condition of the eye itself has received due consideration. By receiving "due consideration," I mean that one would think twice before proceeding to enucleate an eye which has a visual acuity of, say, 6/36, and where the metal has been lodged in, and been removed from, the anterior chamber, and the eye is looking well, even although a positive leucocytic blood count is present. When sympathetic ophthalmitis has actually developed, whether the blood count is typical or not, I think, taking into account the successful cases which have been treated at Moorfields Hospital, that salvarsan is well worthy of a trial, after removal of the exciting eye, if that has not already been done.

Second, I would also advise histological examination, (by a competent pathologist) of the injured eye, and where the typical infiltration of Fuchs is present, then the administration of salvarsan and the careful observation of the remaining eye from time to time. A guarded prognosis should be given, and periodical examinations of the blood should be made.

With regard to the treatment of the second eye when sympathetic ophthalmitis has actually developed, I need only mention the removal of the first eye, if this be still present. Here a difficulty presents itself when the first eye has fair vision, and it may be a question whether it should be left, as it may later on be the better eye of the two.

With regard to the medicinal treatment of sympathetic ophthalmitis, salvarsan has been added to the long list. My first case of sympathetic seemed to improve rapidly on increasing doses of the salicylates, as recommended by H. Gifford.[24] It goes without saying that local treatment, including atropine, fomentations, subconjunctival injections, etc., are all necessary.

As to the operative treatment of the "second" eye, it is important not to undertake any procedure such as an iridectomy or removal of the lens, until the eye has remained quiet for a considerable period, at least one year, since otherwise there is a risk of stirring up a plastic iridocyclitis into renewed activity.

(To be continued.)

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—INJURIES.

(1) **Keiper, George F.—Rupture of the choroid.** *Ophthalmology*, January, 1911.

(2) **Maynard, F. P.—Traumatic subconjunctival dislocation of cataractous lens in its capsule.** *Ophthalmology*, January, 1911.

(3) **Motolese, F.—Traumatic glaucoma : A clinical contribution and an historical review. (Glaucome traumatico : Contributo clinico, rivista storica.)** *Annali di Ottalmologia*, Vol. XLI, fasc. 1-2, p. 111 to 122.

(4) **Cusner.—Serious penetrating wound of the eyeball. (Plaie pénétrante grave du globe oculaire.)** *Société Belge d'Ophtalmologie*, 28 avril, 1912.

(5) **Rutten.—Rupture of the deep membranes of the eyeball from a violent blow from the elbow on the eyelids. (Déchirure des membranes profondes du globe oculaire après un choc violent du coude sur les paupières.)** *Société Belge d'Ophtalmologie*, 28 avril, 1912.

(6) **Natanson, A.—A case of evulsion of the optic nerve. (Ein Fall von Evulsio nervi optici.)** *Klin. Monatsbl. f. Augenheilkunde*, August, 1912.

(7) **Lutz, Anton.—A case of traumatic enophthalmos. (Sobre un caso de enoftalmia traumatica.)** *Anales de Oftal.*, Agosto, 1913.

(8) **Knapp, Arnold.—Report of a case of traumatic equatorial rupture of the sclera.** *Archives of Ophthalmology*, Vol. XLII, No. 5, 1913.

(9) **Lacompte, F.—A contribution to the study of the treatment of fragments of iron lodged in the crystalline lens. (Contribution à l'étude et au traitement des éclats de fer intracristalliniens.)** *La Belge Médicale*, 24 mai, 1914.

(10) **Lang, B. T.—A case of traumatic enophthalmos, with X-ray photographs, showing bony deformity.** *Proceedings Royal Society of Medicine : Section of Ophthalmology*, June, 1914, p. 109.

(11) Henderson, E. Erskine.—Rupture of the optic nerve at the lamina cribrosa. *Proceedings Royal Society of Medicine: Section of Ophthalmology*, Vol. VII, July, 1914.

(12) Wray, Charles.—Six ruptures of the choroid in one eye, including two between the disc and the macula; vision 6/6. *Proceedings Royal Society of Medicine: Section of Ophthalmology*, Vol. VII, July, 1914.

(13) Franke, E.—Eye injuries and lymphocytosis. (Augenverletzung und Lymphocytose.) *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(14) Lacompte, Franz.—A contribution to the study and treatment of intra-crystalline splinters of iron. (Contribution à l'étude et au traitement des éclats de fer intracristalliniens.) *Ann. d'Oculistique*, septembre, 1914.

(15) Snell, Albert C.—A case of extensive accidental corneal splitting. *Archives of Ophthalmology*, November, 1914.

(16) Zimmermann, C.—Annular opacity of the anterior surface of the lens after traumatism. *Ophthalmology*, January, 1915.

(17) Eales, W. H. Fulford.—Some common ocular traumata. *Birmingham Medical Review*, February and March, 1915.

(18) Hardy, W. F.—Injury of eyeball with great loss of vitreous. *American Journal of Ophthalmology*, February, 1915.

(19) Hardy, W. F.—Complete disappearance of an eyeball following a birth injury. *American Journal of Ophthalmology*, February, 1915.

(1) **Keiper's** case, that of a young man injured by a ball, presents no unusual features. The fundus condition is illustrated. A. J. BALLANTYNE.

(2) The patient, whose case is reported by **Maynard**, of Calcutta, was a Hindu who received a blow on the eye from a piece of iron. The lens, which was brownish in colour, was found enclosed in its capsule, dislocated under the conjunctiva in an upward direction. There was no escape of vitreous. Vision was good. A. J. BALLANTYNE.

(3) **Motolese**, of Ancona, has found mentioned in the literature, twenty-nine cases of glaucoma consecutive to contusion of the eyeball. He adds a personal case of glaucoma with strong hypertension, following a blow from the fist. Surgical intervention was refused, but considerable improvement took place under medical treatment. The author expresses no opinion as to the pathogeny, so much disputed, of these forms of glaucoma. A. ANTONELLI.

(4) In the case by **Cusner**, of Brussels, by the explosion of a bottle of beer, the cornea was cut across and the sclera was involved. An iridectomy was made, but the lower part of the iris remained entangled. Sympathetic ophthalmitis did not result. MARCEL DANIS.

(5) In this case by **Rutten**, of Liége, after a blow from an elbow upon an eye, there was marked mydriasis and circumcorneal redness; raised intra-ocular pressure; the eye resembled the eye of an amaurotic cat, in consequence of exudations due to uveitis and hyalitis. It is probable that the compression shivered the posterior coats of the eyeball.

MARCEL DANIS.

(6) **Natanson,** of Moscow, describes the case of a young man who slipped and struck his eye with the point of his stick. Swelling, etc., followed, and when the eye was opened some days later, it was found to be blind.

The description applies to the conditions seen two weeks after the injury. The fundus presented a well-defined hole occupying the position of and corresponding in size to the disc. Round this was a narrow white zone apparently consisting of exposed sclera, and this was surrounded by a much larger zone, paler than the general fundus, from which apparently the retina had disappeared. The edge of this outer zone was sharply defined, and the retinal vessels ceased when they reached its margin. A few hæmorrhages were present in the retina near the torn edge. In the macular and perimacular area the fundus had an opaque, milky appearance. The condition is illustrated by a black and white drawing. A. J. BALLANTYNE.

(7) The patient was thrown out of a carriage, and lost consciousness; he was treated at a hospital, and allowed up on the following day. He was noticed two months later with enophthalmos, but **Lutz**, of Habana, was not able to determine whether this condition had immediately followed the accident or had gradually appeared during the interval. The patient had not paid any attention to this point, and was unable to say whether he had been struck by the horse or by the pole of the carriage. He remained in the hospital three months without any surgical treatment.

Lutz observed that the left cornea was 16 millimetres behind the orbital margin, while the right cornea was only 2 millimetres behind; the difference, therefore, *i.e.*, the enophthalmos, was 14 millimetres. The movements of the eye affected were much reduced, and especially in the downward direction. Passive movement, under cocaine, seemed to be resisted by a loss of elasticity of the tissues around the globe. The eyelids were normal in movement; there was no ptosis, nor any alteration of the frontalis muscle; but the lids were unusually lax, as is the case when the lateral ligaments have been divided in operation. There were some small scars in the upper lid, in the skin, and in the tarsal plate, and from the latter cicatricial bands passed to the fornix conjunctivæ and beyond.

A radiograph showed a fracture of the frontal process of the superior maxilla and a decalcification of the upper border of the orbit, but no increase in the size of this cavity, but rather a reduction in size. The function of the optic nerve seemed unaltered.

Lutz, on the grounds of the preservation of good vision, and the non-enlargement of the orbital cavity, concluded that the condition was due to cicatricial contraction of bands in the front of the orbit. He divided surgically all within reach, after trying injection of fibrolysin without benefit. But the surgical procedure did little good, and Lutz came to the conclusion that there must be deeper bands beyond his reach. HAROLD GRIMSDALE.

(8) **Knapp**, of New York, records the case of a rupture of an eyeball, as a result of a fall on a table. The eye preserved normal tension until removal, and presented a bluish swelling over the seat of the injury. The latter proved to be due to a hæmatoma. The wound in the sclera ran concentric with the equator. 2 mm. behind the external rectus insertion, and was 10 mm. long. The literature of the subject is presented. R. H. ELLIOT.

(9) According to **Lacompte**, of Ghent, all particles of iron lodged in the crystalline lens should be removed as soon as possible by the electro-magnet, giant or hand, and as far as possible by the wound of entry. By these means the transparency of the lens may be kept, and siderosis avoided.

MARCEL DANIS.

(10) A man, aged 52 years, fell upon a girder from a height of 30 feet, breaking his arm and several ribs and sustaining severe injuries to the left side of his head and face. When examined by **B. T. Lang**, of London, seventy-three days after the accident, there was enophthalmos (1 mm. to

1·5 mm. as measured on the exophthalmometer) of the left eye, with narrowing of the palpebral fissure. X-ray photographs showed a fracture of the anterior wall of the left frontal sinus, and a widening of the left spheno-maxillary fissure, together with a stellate fracture of the left malar bone, with a slight posterior displacement of a large portion of the latter. There was no apparent injury to the upper jaw. SYDNEY STEPHENSON.

(11) **Erskine Henderson**, of London, describes and illustrates in colour (A. W. Head) an interesting case of rupture of the optic nerve at the lamina cribrosa. The injury was not a penetrating one, but was due to a blow on the side of the face from a parcel of bricks. The third nerve was also paralysed, and enophthalmos was present. The mechanics of the injury are discussed, both as regards the optic nerve and the third nerve. The author considers that in his case, where there was no penetration of the orbit, the crushing blow probably squeezed the orbital contents violently out and so ruptured the optic nerve. Apparently, this is the twelfth case recorded. A bibliography is appended. ERNEST THOMSON.

(12) The two essential points in the very brief communication by **Wray,** of London, are the picture of the condition and the fact that vision improved from 6/60 to 6/6 in some fifteen months.

(13) **Franke**, of Hamburg, claims to have shown by previous researches that lymphocytosis is to be found in many patients both with recent and with old eye injuries, where there has never been any question of sympathetic inflammation. The cause of this blood change was obscure, but he thinks that more recent investigations have established the fact that in these cases the lymphocytosis is not the result of the injury to the eye, but the consequence of a traumatic neurasthenia or hysteria accompanying the eye injury. A. J. BALLANTYNE.

(14) **Lacompte,** of Ghent, records two cases of small fragments of steel embedded in the lens.* In both, vision was retained for a time, but after intervals of one and half and two months respectively, the lenses became opaque. In both, the cataracts were successfully extracted. The first case was not seen by the author until seven months after the accident, and in the second immediate extraction of the fragment was not attempted because the eye was trachomatous. The author, from a consideration of his own cases and of the literature of the subject, has formed the conclusion that it is advisable to remove by means of a large or small electro-magnet all magnetic fragments lodged in the lens and that, so far as possible, this should be done through the wound of entry, so as to reduce to a minimum the risk of injuring intact regions of the lens. If it is impossible to extract the foreign body by the wound of entry, the method employed by Elschnig should be tried. This consisted in dilating the pupil, making a small radial incision in the lens capsule, drawing the fragment into the anterior chamber by means of the giant magnet through the fresh opening in the capsule, and instilling eserin until the pupil contracted. The fragment was left in the anterior chamber until the following day, when it was extracted by the small magnet. R. J. COULTER.

(15) **Snell**, of Rochester, N.Y., records an unusual case of very extensive injury to the cornea of a farmer. The man was chopping wood and a flying piece struck him obliquely, stripping off a large flap of cornea, and penetrating the anterior chamber ; the flap was replaced after cleansing and was kept in position by a single suture. The cornea cleared ; the lens, which

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* This appears to be the same communication, although published in a different channel, as that abstracted on p. 517 of the present issue of THE OPHTHALMOSCOPE.—Editor.

was wounded at the time of the accident, remained locally cataractous, the opacity showing no tendency to extend; finally, a cilium, carried into the anterior chamber by the accident, became firmly implanted therein by its extremities, the shaft remaining free. The literature of similar accidents is given. R. H. ELLIOT.

(16) **Zimmermann**, of Milwaukee, reports the case of a boy of 13 years whose eye was injured by the discharge from a rifle, loaded with dirt. When seen next day, there was corneal opacity and hyphæma. In the course of a week the opacity and hyphæma had cleared, and ophthalmoscopic examination showed myopia with choroidal changes. On the anterior surface of the lens there was a ring of opacity, 3 mm. in diameter.

Zimmermann discusses the condition in the light of his own case, and of the 32 cases already reported. It is generally agreed that this annular opacity is due to a blow, and the mechanism is usually supposed to involve the crushing of the iris against the lens by the indented cornea. The writer excludes such extreme depression of the cornea, and gives reasons for his belief that suddenly increased intraocular pressure, due to some agent acting either from in front or from behind, can compress the iris border against the lens. This may leave either a grey opacity, due to changes in the subcapsular epithelium, or a pigmented ring due to adhesion of the iris pigment epithelium, the latter being made possible by the exudation of fibrinous material into the anterior chamber after the blow. The possibility of both of these lesions has been demonstrated by animal experiments. A. J. BALLANTYNE.

(17) The Middlemore Lecture for 1914, which was given by **W. H. Fulford Eales**, deals with the commoner injuries to the eyes.

Although written for the general practitioner of medicine, we may say a few words respecting some of the more interesting points brought out by the author. It appears that at the Birmingham and Midland Eye Hospital (to which Eales is attached), no fewer than 11,220 foreign bodies, mostly in the nature of particles of steel or emery, were removed from the surface of the eye during the year 1914. A common accident in the Birmingham district is from small drops of molten lead being splashed up into the eyes. The metal, as a rule, produces only superficial destruction, inasmuch as reflex lacrymation at once reduces the temperature of the metal and the thin film of steam thus brought about still further protects the globe from injury, so that the metallic flakes can often be picked off the surface of the globe without much difficulty. A good account is given of the treatment of serpiginous ulcer following injuries to the cornea. No mention, however, is made of "optochin." By the way, the expression "Saemisch's section," as employed by the author, is not, strictly speaking, correct, since Saemisch (1870) was forestalled by many years by Heuerman (1765) and Guthrie (1843) respectively. Speaking of subconjunctival hæmorrhage, Eales draws attention to an important fact, perhaps a little apt to be overlooked, namely, that if the hæmorrhage appears not at the time of the accident, but some days later, it implies fracture of the anterior fossa of the skull. A graphic but scarcely correct expression used by the author is the "spontaneous digestion" by the aqueous humour of a wounded lens. If the prolapse of the iris through a wound of a cornea be considerable, Eales recommends that it be reduced to the level of the surrounding cornea by the application of the electric cautery, the wound being with advantage covered by a conjunctival flap. Eales has a good deal to say about sympathetic inflammation, of which the local eye hospital, which treats some 34,000 patients annually, can furnish two or three examples only in the course of the year. He attaches importance to a spindle-shaped enlargement of the blind spot, as suggesting the onset of congestion of the optic disc, as a sign of the probable onset of sympathetic inflammation. On the vexed question of a specific micro-organism, Eales believes that a ciliary neuritis is necessary to toxic invasion by the blood stream, and any of the bacteria found in wounds of the eye would be competent to produce that change. He mentions a case in a man, aged 27 years, where extremely slight sympathetic inflammation was found seven weeks after the excision of an eye that remained inflamed and painful after a perforating wound of the sclera in the neighbourhood of the limbus. A single intravenous injection of 0·9 gramme of neosalvarsan was followed by recovery in the course of a few days. SYDNEY STEPHENSON.

(18) The case reported by **Hardy**, of St. Louis, is one of those which unexpectedly turn up now and again where a very severe injury is followed by the recovery of a good deal of vision. In this particular case the injury was by a piece of tin which a boy, the patient, had been pulling with a piece of string, and which might therefore be fairly presumed to be septic. The parents of the boy refused operative treatment. Nevertheless, the case did well, the vision after less than two months being 20/75, and the tension 15 mm. by the Schiötz tonometer. The whole treatment had consisted in local cleansing, and the use of xeroform in oil, 20 per cent.

ERNEST THOMSON.

(19) **Hardy**, of St. Louis, suggests that, in the case he reports, an eye injured at birth but not removed from the orbit, afterwards disappeared spontaneously. He bases his belief on the statement of the mother that at no time had any operative procedure taken place. One finds it difficult to think that the sclera could become entirely absorbed. S. E.

II.—THE DEFINITION OF BLINDNESS.

Discussion on the necessity for an exact definition of blindness. *Proceedings of the Royal Society of Medicine*: *Section of Ophthalmology*, January, 1915.

This interesting discussion, which was inaugurated by **Grimsdale**, of London, and taken part in by **Rockcliffe**, of Hull, **Macgillivray**, of Dundee, **Harman**, of London, **Cross**, of Bristol, **Holmes Spicer**, of London, and the President (**Priestley Smith**, of Birmingham), is difficult to synopsise. Taking into consideration the ease with which the *Proceedings* can be consulted, and the abnormal length of any useful abstract, we advise our readers to peruse the originals.

III.—COMPARATIVE ANATOMY AND PATHOLOGY.

(1) **Nettleship, E. and Hudson, A. C. On a case of blindness from optic neuritis, without intracranial disease, in a pedigree bull. Several cases, probably of the same kind, in other members of the pedigree. References to other cases of amaurosis in domesticated animals.** *Royal London Ophthalmic Hospital Reports*, Vol. XIX, Part i, 1913.

(2) **Coats, George.—The choroid and retina of the fruit-bat.** *Trans. Ophthal. Society U.K.*, Vol. XXXV, 1915, p. 372.

(3) **Pridmore, W. G., and Coats, George.—Demonstration of a filaria from the eye of the horse.** *Ibidem*, p. 387.

(4) **Coats, George.—A parasite in the eyelid of the mouse.** *Ibidem*, p. 390.

(1) **Nettleship** and **Hudson**, of London, give a careful account of the occurrence of blindness in six bulls of the same pedigree, in five of which it came on at the same age, within a month or two of one year; it was permanent and there was no other sign of disease referable to the nervous system; in the sixth case the sight recovered, but the animal died shortly after. In one case the animal was killed, and the brain and eyes were removed for examination. The optic discs were opaque and swollen, the retinal veins full, and the arteries barely visible. Microscopically, the papilla showed much œdema with a vacuolated appearance towards the peripheral parts, in the more central parts there was marked disorganisation of the tissues, the spaces being filled with *débris*. The nervous tissue was much disorganised with increase of nuclei in the supporting tissue. Œdema also affected chiefly the nerve-fibre and ganglion cell layers of the retina, the former being degenerate and the supporting neuroglial tissue increased. The veins were distended, but no change in the walls of the arteries or veins was seen, but there was a slight leucocytic infiltration around; the ganglion cells had almost entirely disappeared; the nuclear layers were unaffected, and degenerative changes seen in the rods and cones were probably of *post-mortem* production. Examination of the optic nerves showed extensive general degeneration of the nerve-fibres, together with increase of the neuroglial tissue back to the chiasma and infiltration around the small vessels. No changes were seen in the corpora quadrigemina, dentate nucleus of the cerebellum, or bulb.

The authors point out the resemblance to the changes occurring in poisoning by alcohol and filix mas, and suggest the possibility of the cause being a toxic agent with selective action, whether of autogenous or exogenous origin could not be decided.

The rest of the communication deals with cases of blindness in animals associated with infections, or possibly due to the presence of noxious substances in food, etc.

The references to the literature are most numerous.

A. H. PAYAN DAWNAY.

(3) It appears that in India, where **Pridmore** works, filaria swimming in the anterior chamber of the horse's eye has been known since the year 1622. Usually one eye alone is affected. Although a single filaria

is present, as a rule, yet as many as three have been observed. The symptoms include epiphora, photophobia, blepharospasm, iritis, turbidity of the aqueous, and a diffuse keratitis. The corneal infiltration may clear and some vision be preserved, provided the parasite be removed at an early stage. In the contrary event, inflammation subsides, but sight is lost.

The exact classification of the filaria that infests the horse's eye is difficult, because the worm does not attain maturity. Neumann and most other authorities believe it to be the immature form of *F. equina*, while others support the claims of *F. papillosa*. However that may be, the present specimen, examined by **Coats**, of London, was probably an immature male of *F. equina*. SYDNEY STEPHENSON.

(4) **Coats**, of London, describes a nematode worm found by chance in the eyelid of a mouse. The animal suffered from a fungating osteo-arthritis of one ankle, but no parasites were found in the granulation tissue or elsewhere in the surrounding structures. Professor A. E. Shipley, of Cambridge University, who was good enough to examine the specimens, considered that the parasite was probably *Ollulanus tricuspis*, closely related to the better known *Trichina* or *Trichenella spiralis*, the cause of trichinosis. SYDNEY STEPHENSON.

IV.—THE BIOLOGICAL TESTS FOR SYPHILIS.

(1) **Browning, S. H.—The luetin test for syphilis and some results.** *Ophth. Review*, January, 1914.

(2) **Manson, W. H., Mackie, T. J., and Smith, H. Edgar.—The Wassermann reaction in ophthalmic practice.** *Brit. Med. Journal*, February 20th, 1915.

(3) **Dighton, Adair.—The luetin test in congenital syphilis.** *Medical Press and Circular*, September 15th, 1915.

(1) In this paper, **Browning**, of London, describes the preparation of luetin according to Noguchi's method. The method of use is by intra-dermal injection. If the reaction is negative, a small area of hyperæmia appears in twenty-four hours which gradually fades away. There are three forms of positive reaction: 1st, a reddish papule appearing in twenty-four to forty-eight hours with a diffuse zone around, becoming bluish-red, disappearing with the accompanying induration within a week; 2nd, instead of disappearing, the papule on about the fourth day becomes œdematous and miliary abscesses form; this is followed by a vesicle of semi-opaque fluid becoming purulent and then discharging, and then a scab forms which is cast in a few days without leaving a scar; and 3rd, the reaction suggests a negative result until after ten days, when a pustular formation occurs, as in the previous form.

This test has been found useful where the Wassermann test has been negative, especially in the chronic course of the disease when the latter test is positive in only about 60 per cent. of the cases.

A. H. PAYAN DAWNAY.

(2) **Manson**, of Glasgow, **Mackie**, of London, and **Smith**, of Aberdeen, have adopted the Wassermann test in 250 cases of eye disease as they presented themselves at the clinics of the Glasgow Eye Infirmary. The exact method employed was the lecithin-cholesterin method of Browning, Cruickshank, and MacKenzie.

A table of results obtained is given below. The authors believe that apart from such conditions as injuries, cataract, and errors of refraction, all cases at an eye clinic should be submitted to the Wassermann test with a view, apparently, to collect evidence and to facilitate efficient treatment.

	Cases.	Positive.	Negative.	Doubtful.
1. Congenital corneal opacities	1	0	1	0
2. Interstitial keratitis ...	63	56	7	0
3. Pemphigus of conjunctiva	1	0	1	0
4. Episcleritis and scleritis	6	2	4	0
5. Sclero-keratitis	3	1	2	0
6. Iritis and iridocyclitis ...	50	27	22	1
7. Cyclitis	3	0	3	0
8. Choroiditis and choroidal atrophy	26	5	20	1
9. Sympathetic ophthalmitis	4	0	4	0
10. Retinitis pigmentosa ...	3	0	3	0
11. Retinal detachment ...	5	0	5	0
12. Neuro-retinitis with hæmorrhage	8	2	6	0
13. Optic neuritis	21	12	8	1
14. Optic atrophy	6	3	3	0
15, Vitreous opacities ...	2	1	1	0
16. Congenital cataract ...	2	1	1	0
17 Paralysis of ocular muscles	13	7	6	0
18. Nystagmus	2	0	2	0
19. Dacryocystitis	3	1	2	0
20. Cerebral syphilis ...	1	1	0	0
21. Disseminated sclerosis ...	1	0	1	0
22 Myopia with choroiditis	6	2	4	0
23. High myopia	2	1	1	0
24. Trachoma	2	0	2	0
25. Retro-ocular tumour (fibro-sarcoma)	1	0	1	0
26. Glaucoma	4	1	3	0
27. "Strumous keratitis" ...	8	0	8	0
28 Parinaud's conjunctivitis	1	1	0	0
29 Choroideremia	1	0	1	0
30. Paradoxical pupillary reflex	1	1	0	0
	250	125	122	3

SYDNEY STEPHENSON.

(3) **Dighton,** of Liverpool, obtained a negative result with the leutin test in six cases of interstitial keratitis in children.

V.—PHYSIOLOGY.

PART I.

(1) **Kuschel, J.—Two cases of interruption of the intra-ocular circulation in the region of the ciliary division after contusion. (Zwei Falle von Unterbrechung des intraokularen Flussigkeitsstromes in Bereiche seines ciliaren Abschnittes nach Kontusion des Augapfels.)** *Zeitschrift für Augenheilkunde*, May, 1911.

(2) **Bielschowsky, A.—On congenital and acquired enlargement of the range of vision. (Ueber Angeborene u. erworbene Blickfelderweiterungen.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911, p. 192.

(3) Hegner.—On perspective through spectacle glasses. (Zur Raumerfüllung durch Brillengläser.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911, p. 59.

(4) Bartels, M.—On anomalies of the movements and position of the eyes. (Ueber Anomalien der Augenbewegung und Augenstellung.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911, p. 188.

(5) Dufour, M.—On the cerebral localisation of some visual phenomena. (Sur la localisation cérébrale de quelques phénomènes visuels.) *Ann. d'Oculistique*, novembre, 1911.

(6) Cords, R.—Remarks upon the examination of the power of estimating distance. (Bemerkungen zur Untersuchung des Tiefenschätzungsvermögens.) *Zeitschrift für Augenheilkunde*, April, 1912.

(7) Thierfelder, A.—The mechanism of visual concepts. (Gedanken über den Mechanismus der Gesichtsvorstellungen.) *Beiträge zur Augenheilkunde*, Part 80, May, 1912.

(8) Thierfelder, A.—A rule for estimating the degree of apparent rotation of an object seen in perspective. (Eine Regel zur Bestimmung der Grösse der perspectivischen Scheindrehung.) *Beiträge zur Augenheilkunde*, Part 80, May, 1912.

(9) Thierfelder, A.—The mechanism of the retina. Outline of a contribution to the theory of vision. (Die Netzhautvorgänge. Grundlinien eines Beitrage zur Theorie des Sehens.) *Beiträge zur Augenheilkunde*, Part 80, May, 1912.

(10) Hamburger.—On the theory of the intra-ocular lymph circulation. (Zur Theorie der intraokularen Saftströmung.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1912.

(11) Brückner, A.—On the galvanic irritability of the eye. (Ueber die galvanische Erregbarkeit des Auges.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1912.

(12) Best, F.—The examination of perspective acuity. (Die Untersuchung der Tiefensehschärfe.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1912.

(13) Cords, R., and Bardenhewer, O.—Remarks upon the examination of the faculty of judging depth. II. Research upon monocular judgment of depth with Pfalz' stereoskopometer. (Bemerkungen sur Untersuchung des Tiefenschätzungsvermögene.) *Zeitschrift für Augenheilkunde*, July, 1913.

(1) The paper by **Kuschel**, of Lüdenscheid, commences with the statement that the intraocular lymph is secreted by the choroid. It flows first backwards and then forwards through the pervious tissue of the optic disc, taking its first tributary stream from the retina. It now passes along Cloquet's canal and reaches the zonular cleft which allows it to reach the canal system of the ciliary body formed by the bridging over of the furrows in the ciliary body by the anterior layers of the vitreous. Here it receives a tributary stream from the ciliary body and reaches the posterior chamber, and eventually by the pupil the anterior chamber. Finally, it leaves the eye

at the iridic angle. This stream may be blocked at any stage, in the vitreous, the ciliary body, the pupil in the spaces of Fontana, glaucoma resulting. Kuschel cites two cases in which the obstruction took place in the ciliary body.

It is unnecessary to criticise these views. As we have stated elsewhere, they are not founded upon any research, exact or inexact, but are merely the phantasies of an imaginative brain. T. HARRISON BUTLER.

(2) **Bielschowsky**, of Leipzig, discussed cases in which there was excessive movement of an eye in one direction giving an abnormal range of vision. Such cases can be distinguished from paresis by the fact that primary and secondary deviation are equal, and that there is more limitation of movement in the opposite direction. The usual type has many similarities with paresis of the VIth nerve. We get (1) an habitual oblique posture of the head. (2) A vertical error appears when the head is held correctly, associated with a corresponding diplopia. (3) There is an increase of the vertical error on looking to the right when the left eye diverges, and to the left when the right diverges. (4) When the head leans to one side, the vertical displacement is considerably influenced.

These symptoms are due to over-action of the inferior oblique. Such a condition may be congenital or may be caused by dislocation of the trochlear pulley during a Killian operation for frontal sinus empyema.

We can often help these cases by tenotomy of the inferior rectus on the opposite side, if there be diplopia or if binocular vision can be attained only by a most uncomfortable oblique position of the head. If preferred, the tenotomy can be combined with advancement of the superior rectus.

The title of this paper seems unsuitable. T. HARRISON BUTLER.

(3) This paper by **Hegner**, of Jena, deals geometrically with the errors introduced when one looks obliquely through spectacle glasses. Generally speaking, the vertical measurements of an object are not altered, but the lateral dimensions vary inversely as the tangent of the angle of the direction of gaze with the primary position. If the glasses be wrongly centered, other errors are introduced. T. HARRISON BUTLER.

(4) **Bartels**, of Strasburg, has succeeded in dissecting out and stretching all the lateral recti of a rabbit in such a way that by a specially constructed apparatus they can be made to give a graphic record of their movements. He finds that when the ear is stimulated all four muscles alter their tonus; an external and internal contract, the other external and internal relax. The probable reflex path of this lateral nystagmus was demonstrated to the Congress by drawings. During the slow stage a stimulus leaves the labyrinth by the *ramus vestibulari nervi octavi* to the oculo-motor nucleus and thence reaches the recti muscles. The resulting movements excite the end organs in the muscles which transmit an apparent impulse by way of the motor nerves (Sherrington, Tyer) to the central organ, probably by way of a subcortical centre. The innervation for the rapid phase follows. When an ear is stimulated, the homolateral eye shows the greatest and most favourable movement, upsetting Hering's law that the innervation of both eyes is always equal in power.

These observations have their parallel in the results obtained by a study of the eye movements of new-born infants, the blind, and amblyopes.

T. HARRISON BUTLER.

(5) **Dufour**, of Nancy, names the point in the nervous visual apparatus at which an external or internal stimulus acts, the point of origin of the resulting phenomenon, and lays down the rule that it is in front of or behind the chiasm according as the eyes are affected independently or together. He

quotes retinal adaptation, Troxler's experiment, and the fusing of bands on a rotating disc as examples in which the point of origin is in front of the chiasm, and Plateau's spiral and Fechner's paradox as instances in which it is behind it. Dealing with scintillating scotoma which is sometimes monocular (as in his own case), but usually binocular, he considers that its point of origin must be situated on the retino-diencephalic neurones sometimes in front of and sometimes behind the chiasm.

R. J. COULTER.

(6) **Cords,** of Bonn, summarises the factors which enable us to judge the relative distance of objects and discusses the usual methods of estimating the degree of binocular vision possessed by any individual. The paper might be exceedingly useful to one preparing for an examination in ophthalmology.

T. HARRISON BUTLER.

(7) This is one of several papers which **Thierfelder,** of Schneeberg, has recently contributed to what might be called the metaphysics of vision. He holds that, while visual sensations normally take their origin in the retina and are the result of centripetal impulses in the optic nerve fibres, the reverse may occur, namely, that the excitation may originate in the central organ and be transmitted centrifugally to the visual cells. These will be stimulated and will set up physiological changes in the nerve fibres which will lead to a psychical result essentially the same as that which would result from a peripheral stimulation. The normal visual picture is the resultant of both these processes. The first, or passive, sensation is presumed to occur in its pure form in the vision of the infant, while the second, or active, sensation is exemplified by dream pictures and visual hallucinations. The nerve fibres which are habitually employed to convey the stimuli which go to make up a given picture, become united into a system, the union being so intimate that stimulation of one part of the system may call up the complete picture, and the stimulus may come from either end. This idea is used to explain the phenomena of visual memory and recollection. A. J. BALLANTYNE.

(8) **Thierfelder,** of Schneeberg, deals with the familiar fact that a rotating wheel, seen from a certain aspect, sometimes seems to be rotating in a direction opposite to the true one. The author points out that the primary illusion is that the distal side of the object seems to be nearer than the proximal one, and this illusion being established the false idea of the direction of rotation naturally follows. The illusion is related to that known as Schröder's staircase, to the skeleton cube which can be imagined as seen from above or from below, and other familiar examples. In each case the essential error is that the object appears to have been rotated towards or away from the observer, taking the proximal edge as the point or axis of rotation. It is the degree of this apparent rotation that is expressed in the author's formula.

A. J. BALLANTYNE.

(9) According to the scheme suggested by **Thierfelder,** of Schneeberg, two sets of cells play an important part in the retina, *viz.*, the visual cells (rods and cones), and the regenerating cells (cells of the outer nuclear layer). Each visual cell is connected by a canal with its corresponding regenerating cell. The visual substance contained in the visual cells consists of molecules which undergo alternately exhaustion and regeneration. When light falls upon the retina, the molecules discharge their accumulated energy and pass out through the walls of the inner segments of the visual cells. In doing so, they stimulate the terminal fibrils of the optic nerve, which are found in this situation. The exhausted molecules pass forwards in the fluid which surrounds the cells, and enter the regenerating cells, where, under the influence of light, and in the presence of a catalytic substance, they become

once more sensitive to light. The molecules are of different sizes, each being tuned to light rays of a definite wave length, the largest molecules for red, the smallest for violet, etc. The nerve terminals are also similarly "tuned." Thus, when light of one colour falls on the retina, only one set of molecules and one set of terminal fibrils are affected, while, if white light or any other mixture of colours reaches the visual cells, analysis of the light occurs, each component being received by the corresponding molecules of the visual substance. After stimulation of the corresponding nerve terminals, the colours are combined to give sensation of a colour which differs from each of its constituents. The author claims that his theory explains the phenomena of colour-blindness, of positive and negative after-images, of anomalous colour effects, etc., but for these and other details of this rather fanciful theory the original should be consulted. A. J. BALLANTYNE.

(10) **Hamburger**, of Berlin, injected the anterior chamber of iridectomised rabbits with sodium indigo-sulphate. Histological examination showed that the scar was always absolutely free from the colouring matter, and he concludes that both under normal conditions and under increased tension there is no evidence of any filtration through a scleral cicatrix in rabbits.

T. HARRISON BUTLER.

(11) **Brückner,** with Kirsch, of Berlin, has investigated the effect of passing an electric current through the eye. An accumulator was used to generate the current which was accurately measured by means of a mirror galvanometer and a shunt circuit. A fluid electrode was applied to the eye after the fashion of the hydro-ophthalmoscope. They found that at the moment of make and break of the current, a sensation of light was experienced in three situations. With feeble current, a flash can only be detected in the extreme periphery of the field. A stronger current causes a phosphene to appear in the centre of the field., whereas, a still stronger current makes the blind spot show up as a bright or a dark disc. The peripheral phosphene is not influenced by adaptation, but the central flash and the illumination of the blind spot appears during dark adaptation twice as easily as during light adaptation. T. HARRISON BUTLER.

(12) **Best**, of Dresden, has interested himself in the conditions which modify the power of judging distance and depth. He says that the average ability amounts to 30", but a practised individual can estimate differences up to 10". It is possible to estimate this power as accurately as the visual acuity. The power of a single-eyed person to estimate depth is a direct function of the visual acuity of the single eye. Best used Pulprick's method in his examinations. He found that when an eye was defective, the loss of perspective power was a direct function of the loss of acuity in the defective eye. In cases of high myopia and other errors of refraction, the perspective power may be normal, but is often reduced. T. HARRISON BUTLER.

(13) **Cords and Bardenhewer,** of Bonn, decide that the Pfalz instrument is not an ideal one for the purpose; they found that normal persons with one eye tied up often made better estimations of the position of the rods than those who had been blind in one eye for a long time, and also that a very little practice served to educate those examined, so that they got much better results than they did when first confronted with the instrument.

T. HARRISON BUTLER.

VI.—THE RESORPTION OF CATARACT.

(1) Cusner.—Retrocession of a traumatic cataract. (Rétrocession d'une cataracte traumatique). *Société Belge d'Ophtalmologie*, 28 avril, 1912.

(2) Krevet, B.—A clinical contribution respecting the spontaneous absorption of senile cataract. (Zur Kasuistik der Spontanresorption der Cataracta senilis.) *Zeitschrift für Augenheilkunde*, March, 1914.

(3) Bourland.—An exceptional case of partial spontaneous absorption of a traumatic cataract. (Un cas exceptionel de résorption partielle spontanée d'une cataracte traumatique.) *Ann. d'Oculistique*, septembre, 1914.

(1) **Cusner**, of Brussels, relates a case where during iridectomy, the crystalline lens was wounded. The traumatic cataract thereby produced disappeared completely without treatment. MARCEL DANIS.

(2) **Krevet**, of Dresden, collects the published cases of spontaneous resorption of senile cataract, and adds two more which came under his notice. The process is similar to hypermaturation. Most of the cases were associated with iridocyclitis or glaucoma, and the process cannot be looked upon as a spontaneous healing, but rather as a further degenerative change. A coloured plate accompanies the text. T. HARRISON BUTLER.

(3) **Bourland**, of Oran, records a case of cataract resulting from injury at the age of 15 years in which the upper half of the lens became absorbed, allowing of V.=5/10 with a +10D. sph. lens, while the lower half remained opaque. He theorises as to the cause which prevented the lens from being completely absorbed, and states that at first sight the appearance of the eye suggested that the lesion was a traumatic subluxation. From the description given, it is difficult to see how a competent observer could make such a diagnosis after proper examination. R. J. COULTER.

VII.—DETACHMENT OF THE RETINA.

(1) **Discussion on detachment of the retina.** *Transactions Ophthalmological Society U.K.*, Vol. XXXV, 1915.

(2) **Paton, Leslie.—Cases of healed detachment of the retina.** *Transactions Ophthalmological Society U.K.*, Vol. XXXV, 1915.

(3) Moore, Foster.—A case of subsidence of the albuminuric retinitis of pregnancy with the coincident disappearance of bilateral globular retinal detachments. *Transactions Ophthalmological Society U.K.*, Vol. XXXV, 1915.

(4) Moore, Foster.—A case of subsidence of albuminuric retinitis in which bilateral retinal detachments have disappeared. *Ibidem.*

(5) Walker, Cyril H.—A case of spontaneous simple detachment of the retina treated by multiple puncture; permanent recovery. *Transactions Ophthalmological Society U.K.*, Vol. XXXV, 1915.

(1) Abstracts of the opening papers of this discussion at the annual meeting of the Ophthalmological Society of the United Kingdom held in April have already been published in THE OPHTHALMOSCOPE for May, 1915.

Those who took part in the discussion which followed the papers (by Maitland Ramsay, Leslie Paton, and Stephen Mayou) were as follow, namely: Gustavus Hartridge, E. T. Collins, Sir Anderson Critchett, J. B. Lawford, R. R. Cruise, Sydney Stephenson, Leighton Davies, P. W. Maxwell, Charles Higgens, George Mackay, and F. R. Cross. Brief replies were afterwards made by the openers of the discussion.

The general impression gained by a perusal of the remarks of the various speakers is that while some, probably the minority, were as pessimistic as ever on the subject of the curability by treatment of retinal detachment, others had come to hold more optimistic opinions. Whether such optimism is based or not on sufficient evidence, on a sufficient number of faithfully and fully recorded cases, may very possibly emerge at some future discussion sometime within the ken of the present or the next generation. Hopefulness from time to time has been a prominent characteristic of all such discussions from early records to the present day.

We shall endeavour briefly to synopsise the principal opinions of the various speakers:

G. Hartridge, of London, divided traumatic detachment into two classes, namely: (1) caused by effusion of blood, which tend towards spontaneous cure; (2) detachment following the entrance and subsequent removal by the magnet of a magnetic foreign body. Hartridge had never seen a case of this kind recover, and, further, was of opinion that most cases of foreign body removed from the back of the eye ended in detachment of the retina.

E. Treacher Collins, of London, belongs to the optimistic group. He reported two interesting cases of detachment in myopia, in which cure of the detachment and great improvement in vision resulted from puncture with the galvano-cautery. Both were instances of double detachment. In the first, both eyes were operated on, although only one recovered; in the second, one eye, with a recent detachment, was operated on, the other eye having a very old-standing detachment. The essential conclusions of the seven arrived at by Collins are, first, that detachment of the retina is not an incurable affection; and, secondly, that it may be cured as the direct result of treatment.

Sir Anderson Critchett, of London, is, on the whole, pessimistic. He told a story of a consultation on one of his patients with a foreign ophthalmologist. The consultation was, one gathers, involuntary on the part of Sir Anderson. At any rate, the foreign oculist's treatment for the detached retina consisted in sitting the patient up in an arm chair and firing three syphons of water at her eye, while the eye was kept open. Sir Anderson then retired from the case. Later on, the patient developed a cataract as a result of this very extraordinary mishandling.

It is worthy of note, in view of the hopeful results claimed for galvano-puncture by some of the speakers, that Critchett has done this operation three times; "in one with an eminently satisfactory result, in a second with a moderate result, while that in the third was absolutely negative."

J. B. Lawford, of London, related the case-histories of three patients, in whom the treatment by prolonged rest has resulted in replacement of the retina, which endured for a number of years. The replacement was accompanied by recovery of partial, but useful, vision. These, says Lawford, are the only instances of non-traumatic detachment under his personal observation, in which non-operative treatment has resulted in a recovery of proved duration.

R. R. Cruise, of London, submitted the theory that detachment of the retina is frequently a sequela of disease of the retina itself. After relating the case which led to the evolution of this theory, Cruise suggests that in a proportion of cases of detachment taking place in an apparently healthy eye, the sequence of events is :—

(1) A peripheral rarefying retinitis, leading to absorption, thinning, and contraction. (2) Consequent on the contraction there is a tendency to straighten the arc from ora serrata to optic disc. (3) This tendency is resisted by the pressure of the vitreous subjected to intra-ocular tension. (4) And so the retina yields and tears, and fluid passes behind it, producing detachment of the retina. Cruise endorses Leslie Paton's optimism with regard to operation. He operates by galvano-puncture.

Sydney Stephenson, of London, related two cases of spontaneous cure. In one the detachment was probably due to blood and occurred in the last stage of pregnancy. The detachment had almost disappeared in a week; the vision ultimately came up to 6/5 with a full field; and the cure had persisted for many years. The second case was of unknown causation. The patient had been operated on by another surgeon three-and-a-half years previously and discharged from hospital as unrelieved. Yet, when seen by Stephenson, there was practically no trace of the detachment. Although the field was fairly full, and the retina in place, the V.A. was only 1/18. There were fundus indications of the former disturbance. These are illustrated in a plate.

D. Leighton Davies, of Cardiff, had had an unusually large number of detachments in non-myopic eyes. In a series of 40 cases 14 (36 per cent.) occurring in emmetropes and hypermetropes could not be explained. There seemed to be no factor common to all, but there were some suggestive points. Of the 14 cases 9 occurred in persons over 40 years old. In 4 of these there was definite arterio-sclerosis of the retinal vessels. Another had definite generalised arterio-sclerosis, and another, aged 70 years, had frequent attacks of epistaxis and subconjunctival hæmorrhages. Davies thinks there is a useful field for investigation in relation to the cardio-vascular system in cases of retinal detachment.

P. W. Maxwell, of Dublin, was of opinion that non-operative treatment, by rest and bandaging of the eyes, was beneficial in some cases, but the improvement was not often permanent. He had found some benefit from the use of the cautery, but had had disastrous results from other methods. He mentioned a case of spontaneous cure, in which toxæmia appeared to have been a contributing cause of the detachment.

Charles Higgens, of London, expressed the hope that his pessimistic attitude towards the treatment of detachment might be lessened by the use of the cautery to the next suitable case which might come under his care. So far he had not employed this method.

George Mackay, of Edinburgh, following the teaching of Argyll Robertson, had always avoided operating for detachment.

The President, **F. R. Cross**, of Clifton, Bristol, said that it was obvious that this debate had been of the greatest possible value; and from the opening papers, as well as from the experiences of subsequent speakers, it would now be felt that cases of detached retina were not hopeless at any rate.

As the result of a motion, which had been put by E. T. Collins, seconded by F. R. Cross, a Committee was appointed "to collect, critically examine, and collate cases of reported cure of detachment of the retina."*

ERNEST THOMSON.

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* A circular seeking information was issued by the Committee in May last.—EDITOR.

(2) **Paton**, of London, showed three cases of healed detachment. The first case was that of a female, in whom, in 1908, rest treatment had been carried out. She had six weeks in bed, with hot air baths, mercury and potassium iodide, and six weeks on the couch. At the end of that time the detachment had completely subsided. She had since remained quite well.

The second case was that of Miss P., aged 41. There was an old detachment in the left eye. Detachment occurred in the right eye early in June, 1907. Paton operated in August. The detachment was large and on the nasal side. After the operation by the galvano-cautery, the detachment went back into position on the nasal side, and an almost equally large detachment appeared on the temporal side. On 9th September, operation on the temporal side: patient kept in bed till mid-October. By November the V.A. was not much improved, but in 1908 it had improved to 6/18. Now, eight years after the operation, V.A. 6/9 with —16 D., the original myopia in 1907 having been 15 D.

The third case was that of a gamekeeper who in 1907 had an old detachment in the right eye and a recent one in the left eye with V.A. 3/60. Paton had performed three operations by the galvano-cautery on this left eye, with the result that in August, 1910, V.A. was 6/9 and since then, has varied between 6/9 and 6/6. ERNEST THOMSON.

(3 and 4)—In both the cases reported by **Foster Moore,** of London, the essential fact is that stated in the title.

(5) The case reported by **Walker**, of Clifton, Bristol, is that of a male typist, aged 39 years, moderately myopic (R.E. 4.5 D., L.E. 3 D, with astigmatism in each) in whom a detachment was at first treated by palliative measures only. As this led to no permanent benefit, five punctures were made with a rather large cutting-edged discission needle, at a distance of about 10 mm. from the limbus. The needle was plunged in to a depth of 10 mm. or 12 mm., so as to make sure of pricking the retina, but no attempt was made to cut the retina or divide any imaginary vitreous bands. A little subretinal fluid followed the fourth puncture, and as the needle was withdrawn the fifth time, it was rotated 90 degrees, and a considerable amount of subretinal fluid escaped subconjunctivally. The operation took place in December, 1901, the patient resumed full work in March, 1902, with V.A. 6/6 four letters, no evidence of detachment, and a normal field. Ever since then he has been engaged in teaching shorthand and typewriting. He has been worried a little by vitreous opacities, but in March, 1915, had a normal field and V.A. 6/6 five letters. ERNEST THOMSON.

VIII.—LYMPHANGIECTASIS.

(1) **Rössler, Fritz.**—Elephantiasis-like swelling of the eyelids following suppuration of the neighbouring lymphatic glands. (Elephanthiastische Lidschwellung nach Vereiterung der regionären Lymphdrüsen.) *Klin. Monatsbl. f. Augenheilkunde*, September, 1912.

(2) **Jessop, Walter H.**—Tumour lymphangiectasis of the lower lid. *Proceedings of the Royal Society of Medicine: Section of Ophthalmology*, December, 1914, p. 5.

(3) Mackay, George.—**A note on lymphangioma of the orbit treated with X-rays.** *Trans. Ophthal. Society U.K.*, Vol. XXXV, 1915, p. 180.

(1) **Rössler,** of Vienna, describes the case of a man, 18 years of age, who appeared with a tense elastic swelling of the left upper eyelid and its neighbourhood, rendering even passive opening of the eye extremely difficult. His history was that three years earlier, he had a small pustule on the left cheek, which disappeared after he had scratched the top off it. A few weeks later he received a blow on the left parotid region, which was followed, at an interval of some weeks, by a painful swelling in front of the left ear. Pus was removed from this by incision. Then a swelling of the same kind appeared at the angle of the jaw. When this had been evacuated, still another swelling appeared lower down, below the jaw. During the healing of the wounds, swelling of the upper lid rapidly appeared, and it had been present ever since, if anything increasing in degree. There had never been any inflammation of the lid or of the eye; there had been no pain; and he suffered from no constitutional disease.

When seen, he had a number of indrawn, irregular cicatrices in front of the left ear, over the angle of the jaw, and in the submaxillary region. In discussing the pathology of this condition, the author points out that there is reason to believe that the mere destruction of the glands would not occasion such a lymphstasis. Perhaps the septic inflammation of the glands led to an occlusion of the peri-glandular lymph paths.

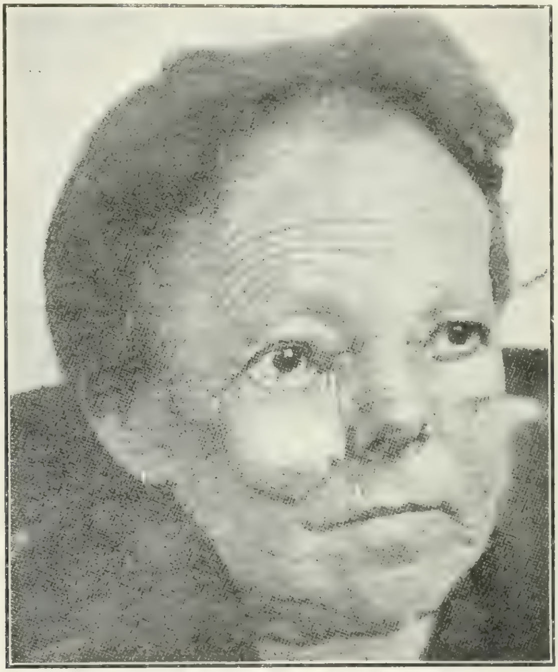
The case was treated by removal of part of the swollen lid and overlying skin. In the excised portion the connective tissue fibres were found to be thickened and twisted, forming homogeneous strongly refractile strands, which gave no amyloid reaction. In some places they presented a fine longitudinal striation. The interfibrillary spaces were reduced in size and filled with red blood corpuscles. The lymph- and blood-vessels were much dilated and well filled, and were surrounded in places by heaps of small round cells and mast cells. This is the microscopic picture characteristic of pachydermia lymphangiectatica. The localisation of the swelling is explained by the involvement of the glands which drain this area.

A. J. BALLANTYNE.

(2) **Jessop,** of London, has an interesting case of lymphangiectasis of the lower lid of about the size of a small orange, in a female, fifty-one years of age. The swelling was of two years' duration. The general characteristics of the swelling, which was in most of its extent semi-fluid to the touch and which pitted readily upon pressure, are shown in the accompanying figure. The skin covering the mass was smooth from distention. The upper eyelid had recently become œdematous, and some thickening and œdema had made its appearance in the temporal region. Ophthalmoscopic appearances normal, and vision 6/6. Skiagrams showed no changes in bones or sinuses. Nothing abnormal was found in throat or nasal passages. No history of erysipelas.

Considerable pressure was applied to the tumour under the influence of a general anæsthetic, when the swelling disappeared, but at the same time there was much swelling in the temporal region, the eye was greatly proptosed, the conjunctiva chemosed, and the upper lid swollen. The tumour regained its original dimensions after six hours. There appeared to be little doubt that the growth was in the nature of a lymphangioma. Eventually, the tumour was removed, and on cutting into it, the skin surface was found to be thickened and a central cavity to contain a blood-stained serous fluid. The cavity, which was lined by endothelium, extended to beneath the conjunctiva of the lower lid, but no communication could be made out with the temporal region. But on pressing over the swelling in the temporal region, blood-stained serum exuded from the wound. The tumour, then, was formed by a cyst-like cavity pushing down and stretching the lower lid.

Specimens were examined by F. W. Andrewes, and reported as lymphangiectasis, pure and simple. In the loose connective tissue of the dermis were dilated lymph spaces, irregular and ragged, and not lined by endothelium. The skin was normal. The fluid contained by the cyst was a mixture in all probability of lymph and serum, its protein content amounting to 2·17 per cent.



Lymphangiectasis of Lower Lid

Jessop concludes that the tumour was due to lymphangiectasis, the obstruction being probably in the orbit or temporal region. The swelling of the lower lid was caused by enlargement of the tissue spaces, producing a large cystic formation. SYDNEY STEPHENSON.

(3) A child, aged fifteen months, was brought to **Mackay**, of Edinburgh, on account of displacement of one eye, first noticed when she was about one year old. Examination under chloroform showed that the proptosis was due to a soft, thin-walled cyst, containing blood, the outlying part of which showed through the conjunctiva above the tarsal border, and could be seen on raising and everting the upper eyelid. By puncture of the cyst, Mackay evacuated about a dessert-spoonful of dark, bloody fluid, whereupon the eyeball returned to its natural position. The operation had to be repeated in a couple of days. At this stage, Harold J. Stiles, of Edinburgh, made the diagnosis of "lymphangioma with hæmorrhages," and by way of treatment proposed excision of the cyst wall as far as practicable. That operation,

which was undertaken, decidedly improved matters for several weeks, but there was then some return of the proptosis. Seven applications of the X-rays, at intervals of a week, were next made, with marked benefit. Treatment was discontinued after one or two further applications.

A year afterwards (1907) X-rays were again applied.

Four years later (1911) the eye had again become prominent, and seven applications of X-rays were made, again with satisfactory results.

After a lapse of seven months, weekly applications of the rays were made until the end of the year (1912). They were resumed in 1914. Seventeen applications, in doses varying from 1/8 to 1/3 of an erythema dose, were then spread over the period of ten months from April 25th, 1914, to February 25th, 1915. In consequence of this treatment, the proptosis was replaced by a condition almost resembling enophthalmos, as shown in the photographs which accompany the communication.

Mackay concludes by describing the characteristics of lymphangiomata in general and the X-ray *technique* adopted in his case in particular.

Discussion.

G. W. Thompson, of London, had removed three lymphangiomata by dissection from the orbit of young children. Their removal was easy. His third case, in a baby, however, was somewhat complicated, inasmuch as there were extensions upwards, downwards, and backwards into the orbit.

C. Wray, of London, described a case of lymphangioma in an infant a few weeks old. Under a general anæsthetic, 75 per cent. alcohol was injected into the growth at three places. After three operations, the tumour disappeared, and the eyeball returned to its proper position, and at the time of speaking, nothing remained beyond a little fibroid induration beneath the skin. The amount injected was ten minims, and the resulting reaction was inconsiderable. SYDNEY STEPHENSON.

BOOK NOTICE.

On Paraspecific Serotherapy by the Mouth in Infections of the Eye (De la Sérothérapie Paraspécifique par voie buccale dans les Infections Oculaires.) By Dr. LÉON FROGIER. Paris: Jouve & Cie, 15, Rue Racine. 1915.

Dr. Léon Frogier, who is *chef de clinique* to Dr. Darier, devotes his Paris thesis to a discussion of the advantages attending the administration by the mouth of antidiphtheritic serum.

In an introductory chapter he recalls the fact that since 1903 his master, Darier, has treated numerous non-diphtheritic affections of the eye by the injection of this serum, and has, in fact, constituted himself the champion of what has come to be called "paraspecific therapy" as applied to affections of the eye. This method of treatment depends upon the principle that in addition to their specific action, serums possess the property of giving to any organism invaded by an infective agent the elements of general defence, allowing it to resist up to a certain point the said infection. If treatment by antidiphtheritic serum does not invariably suffice of itself to put an end to the morbid process, at least it re-enforces powerfully any other therapeutic means that may be employed in a given case.

For some years now, Darier has advocated the giving of the serum by the mouth, and has found that it acts as well when administered by that as by any other route. One advantage of the method is, that when given internally, the serum never provokes anaphylaxis or serum sickness. The method has been tried successfully by Darier, Jacqueau, Verrey, Solm, Dor, Ruppel. Bersaque, and de Waele, to say nothing of Frogier, who now publishes details of eighteen personal cases. The conditions treated by Frogier included membranous conjunctivitis, infective ulcers of the cornea (with or without hypopyon), plastic iritis, irido-cyclitis, and infections after injuries and operations.

In an acute infection of the eye it is of great importance to act quickly before irremediable damage has been produced. The vital resistance of all the tissues must be strengthened. The elements of defence may be found in the normal serum of animals, or, better still, in activated serum. The practitioner should employ the first anti-microbian serum on which he can lay his hands, and of these, antidiphtheritic serum is usually the easiest to come at. Frogier recommends the following draught.—Antidiphtheritic serum, 10 cmc.; syrup of raspberries, 30 cmc.; water, 110 cmc. S.—A soup-spoonful to be taken every hour for the first three days, and every other hour afterwards. As soon as a bacteriological examination has allowed a precise diagnosis to be made, and if the paraspecific serum has not already cured the case, specific serum or vaccine may be substituted.

It is not claimed that paraspecific serotherapy is an infallible panacea. It is a powerful re-enforcement of the defences of the organism, a potent tonic which aids the body to resist the progress of infection. But if the last-named is too advanced or too virulent, nothing is able to stop it, a fact that must never be forgotten.

Frogier's more important conclusions are as follows :

1. Paraspecific therapy is a powerful stimulant of vital energy, which allows the organism to resist more easily infective agents.
2. The most constant result of paraspecific therapy is the relief of pain.
3. Intra-venous or subcutaneous injection is the surest and most scientific means of practising paraspecific therapy, provided the fear of serum accidents does not paralyse the ardour of the medical man and lead to the administration of inadequate doses, or cause the patient to reject this method of treatment altogether.
4. The administration of serum by the mouth, however, avoids all serum accidents, and by this means the administration of the remedy may be continued for several days.
5. The giving of serum by the mouth is as efficacious as by injection, and is free from danger.
6. Paraspecific serotherapy by the mouth relieves pain, prevents the progress of the infective process, and aids in the resorption of infiltrations and exudations and in the processes of repair. SYDNEY STEPHENSON.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

CLINICAL STUDIES OF OCULAR PALSIES.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—In Dr. Ernest Thomson's generous notice of my "Clinical Studies of Ocular Palsies," there is one small point on which I may perhaps be allowed a word of correction. Dr. Thomson writes that my article urges the "ophthalmologist" to be "more careful than he is apt to be in getting at the root cause of ocular palsies." This would read as if I had invidiously addressed my pen to some particular class of practitioners—a position I should be reluctant to assume. Certainly I could not pretend to speak to the "ophthalmologist," since, at least for me, he escapes definition. The physician I know, and the ophthalmic surgeon; but the "ophthalmologist"—who is he?

Yours sincerely,

C. O. HAWTHORNE.

LONDON, W.,
September [illegible], 1915.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—I am obliged for the advance proof of Dr. Hawthorne's letter. I willingly admit that Dr. Hawthorne addresses the "physician," that is, presumably, the "medical practitioner," whatever his position. Needless to say, he will often be—what is one to say to please Dr. Hawthorne—a "student and practitioner of ophthalmology." But, what is Dr. Hawthorne's quarrel with the word "ophthalmologist"? Does it not—although the term is clumsy—express the meaning of the foregoing periphrasis in one word? "Ophthalmic surgeon" does not cover the ground, and "oculist" is confused with "optician" by the laity. Will Dr. Hawthorne not admit the words "anatomist," "physiologist," and many others? What, in fact, is the point of his objection to this word ophthalmologist? Can he suggest a better one, that will cover all who are specially interested in ophthalmology?

I am, Sir, yours, etc.

ERNEST THOMSON.

THE OPHTHALMOSCOPE DIARY.

	1915.	
American Academy of Ophthalmology and Oto-Laryngology	Oct. 5th to 7th	Chicago, Ill.
Midland Ophthalmological Society.	Oct. 5th	Birmingham.
Royal Society of Medicine: Section on Ophthalmology	Nov. 3rd	1, Wimpole Street, W.
	1916.	
Royal Society of Medicine: Section on Ophthalmology	Feb. 2nd	1, Wimpole Street, W.
American Ophthalmological Society.	May 9th & 10th	Washington, D.C.
Royal Society of Medicine: Section on Ophthalmology	June 14th	1, Wimpole Street, W.

THE

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A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

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ORIGINAL COMMUNICATIONS.

GLASS-WORKERS' CATARACT.*

BY
WM. ROBINSON, M.D., M.S., F.R.C.S.ENG.,
SURGEON TO THE SUNDERLAND AND DURHAM COUNTY EYE INFIRMARY
AND
SENIOR SURGEON TO THE ROYAL INFIRMARY, SUNDERLAND,
ENGLAND.

History.

THE frequency with which hard cataract was noticed in bottle-makers who came for treatment to the Sunderland Eye Infirmary, induced me to make an enquiry into this subject, and my results were recorded in two papers which appeared in the *British Medical Journal* of 24th January, 1903, and of the 17th August, 1907. The title of the first paper was " Bottle-Finishers' Cataract," because, up to the time it was published, nearly all the patients that I had examined had been bottle-finishers; but my subsequent investigations showed that the disease occasionally occurs in other classes of workmen who make bottles and therefore my second paper was headed " Bottle-Makers' Cataract." Not only did I discover the marked frequency with which cataract occurred in bottle-makers, but I found in the great majority of patients that the opacity began in a characteristic way in the cortex of the lens at its posterior pole.

Subsequently I found that certain continental observers had drawn attention to the frequency of cataract in glass-workers in the last century, but that none had noted the peculiar features of its earlier stages.

Our Eye Infirmary draws its patients from about three quarters of a million of people, whilst the workers (men and boys) in the bottle trade number only about 700, and as several bottle-makers came with cataract, it was obvious that it was a disease more frequent in them than in the rest of the community. In my second paper I said that the investigation of the condition of the eyes of iron and steel workers and of other men whose eyes were exposed to a great heat was desirable. Since that time I have seen two or three examples of posterior cortical cataract in iron workers, and one in a pet dog which had the habit of lying with its head on the fender and looking into the fire.

My first paper attracted the attention of Dr. T. M. Legge, H.M. Medical Inspector of Factories, and he brought the matter before the Departmental Committee appointed by the Home Office to enquire into the industrial diseases which should be scheduled for compensation in connection with the Workmen's Compensation Act (1906). My investigations were confined to workmen belonging to three bottle works in the Sunderland district, and Dr. Legge determined to examine for himself a large number of glass-workers. He therefore came to Sunderland, examined some of my cases, and made himself familiar with the characteristic appearances of the opacity in the lens in the early stages of the disease. He found, as the result of his examinations, most striking confirmation in all respects of the conclusions brought out in my paper, as will appear from the summary of his figures given below.

---

* A paper read before the Oxford Ophthalmological Congress on 16th July, 1915.

The Departmental Committee on Compensation for Industrial Diseases as the result of prolonged examinations of medical men (including myself), glass manufacturers, and glass-workers, in their second report (1908), state that "Our further investigations lead us to the clear conclusion that cataract is many times more prevalent among men who work with molten glass than it is among the rest of the population"; and after devoting to the question long and careful consideration, and after a ballot had been taken among the glassworkers, which showed that the workmen themselves were divided in opinion as to the effect upon their interests in scheduling the disease, the Committee arrived at the conclusion that if the disease were scheduled in the same manner as other industrial diseases, the workpeople in the glass trade would lose more than they would gain; that employers would be likely to impose a medical examination of the workmen's eyes; that men, who from any cause were out of work and who revealed symptoms of opacity of the lens would find their chances of obtaining fresh employment seriously prejudiced, in spite of the fact that they might remain thoroughly efficient for many years longer; and that in some cases dismissal from present situations might take place.

"There is, however, an alternative course. The operation for the removal of cataract is attended by practically no danger, and among glass-workers usually enables them to obtain employment again, sometimes even at the highly skilled work at which they had been formerly engaged. If the period, in respect of which compensation was made payable, were limited to the time necessary to cover the period of incapacity immediately preceding and succeeding the operation, a just relief would be given to the workmen, while the burden on trade would be reduced to such very small proportions that we cannot believe that the employers would incur the expense of arranging periodical medical examinations or be guilty of the harshness of dismissing men whom they knew to be suffering from a slowly ripening cataract. The Workmen's Compensation Act enables such a limitation to be effected without further legislation, for section 8 (6) of the Act empowers the Secretary of State to extend the provisions of the section to diseases other than those first scheduled, either without modification or subject to such modifications as may be contained in the order.

"We recommend that 'Cataract in Glassworkers' be added to the first column of the Schedule of Industrial Diseases for which compensation may be claimed; that 'Processes in the manufacture of glass involving exposure to the glare of molten glass' be added to the second column and that the compensation should be made payable only in cases where an operation is undergone and for a period not exceeding six months."

The Home Office referred the exact etiology of Cataract in Glassworkers to the Royal Society, a committee of which was appointed in 1908 and is still investigating the subject. A small sub-committee of this committee consisting of the late Dr. G. J. Burch, the late Mr. Marcus Gunn, Mr. Herbert Parsons, and Mr. Anderson came to Sunderland and I showed them several examples of the disease. They also visited and examined workers at Gateshead and St. Helens, and they have confirmed my statements. As a result several researches have been undertaken, some of which are referred to later, the papers by Sir William Crookes, Parsons, H. Hartridge and Hill, and Martin being freely quoted under "Etiology." I await with great interest the full report of the committee.

The Nature of the Work of Glassworkers.

In a paper of this kind it is necessary to describe briefly the process of making bottles, in order that the names of the different classes of workmen may be understood, and that it may be obvious why some workmen become cataractous, whilst others do not. It must be pointed out, too, that the method of making ordinary heavy bottles is quite different from that by which light flint bottles (*e.g.*, medicine bottles) are made. The work of the pressed glass maker will also be referred to shortly.

Ordinary bottles.—In making these the mixed materials (sand, lime, clay, marl, etc.) are thrown by the "founder" into the large furnace ("tank"), which is kept at a white heat by the burning of currents of coal gas and air directed on to the surface of the metal. The tank may contain as much as 350 tons of metal and its surface may measure as much as 80 square yards. The "founder," with a long iron rake, pushes the materials away from the mouth of the furnace into which he has thrown them, and consequently he must look occasionally into the intense light and heat (about 2,500° F.). The intensity of the light is about 540 lux. He is provided with a piece of framed dark-blue glass, through which he can look into the furnace, but this he rarely uses, and consequently some of these men get cataract. The "founder" may work six or seven shifts a week of twelve hours each. At the opposite end of the furnace—the working end—are several openings, at which the different bottle-makers work in squads of five men each.

A lad generally begins bottle-making as a "taker-in," and it is his duty to carry the finished bottle from the bottle-finisher to the annealing chamber. He is afterwards promoted to be a "putter-up" or "wetter-off," whose duty is to put up into the furnace to be heated the iron pipe, six feet in length, on which the bottles are blown, and to knock off the remains of the bottle that has just been made.

He is next promoted, while still an apprentice, to be a "gatherer," whose duty is to dip the iron pipe into the sea of molten metal and take up just sufficient liquid glass to make a bottle. During this part of the work he necessarily looks into the furnace; but he is young and his eyes do not usually suffer, although the skin of his face, especially that of his left cheek, is often inflamed and blistered by the heat. With his back to the furnace he next rolls the glass on a stone roughly forming the neck and shoulder of the bottle, and finally hands the pipe on to the "bottle-blower," who shapes the body of the bottle on another stone and then places it in a mould and blows down the pipe into it to form a bottle. During this process the cheeks of some (but not of all) of the bottle-blowers balloon out enormously. About two out of every three apprentices become expert enough to be promoted from being "gatherers" to be "bottle-blowers," and they are about the age of 21 at the time of promotion. A "gatherer" sometimes becomes a "founder." Some of the "gatherers," who are not fortunate or skilful enough to be promoted, do develop cataract. The glass-blower hands the blown bottle, still on the iron pipe, to the "bottle-finisher," who takes hold of it with a "cage" or "sticker punty": the bottle is then cut from the pipe. The glass-blower does not look into the furnace and his eyes do not become cataractous, unless they suffered whilst he was a "gatherer." The bottle-finisher, holding the bottle on the "punty" in his left hand, with an iron rod in his right, looks directly with both eyes into the sea of molten glass, the temperature at this end of the tank being about 2,000° F., and takes just sufficient metal to form the rim on the neck of the bottle. Having done this, he turns away from the furnace, and sits under the shelter of a brick shade, in order to put the rim on the bottle. His left cheek is now towards the hot wall of the furnace, and it is therefore sometimes, although rarely, more inflamed than the right cheek by the heat. The extent to which the eyes of the bottle-finisher are exposed to the brilliant light and intense heat from the furnace, may be estimated by the fact that he generally works five shifts each week, a shift lasting eleven hours, and at each shift he finishes 110 to 120 dozen bottles, at the rate of 2½ bottles per minute. The time for which he is obliged to look into the furnace whilst he gets the metal for the rim of each bottle is about three seconds, so that at each shift his eyes are exposed to the glare of the furnace for at least sixty-six minutes, or about five-and-a-half hours per week. This is the man, therefore, whose lenses most often become opaque. With the old furnaces the left eye was more exposed to the furnace, but in the present furnaces both eyes are equally exposed to the light and heat.

Only about one out of two bottle-blowers is promoted to be a bottle-finisher, and when he is promoted he is generally between the ages of 25 and 40. The bottle-finisher is a much older man at his trade than either the "taker-in," the "gatherer," or the "putter-up," who are usually under the age of 21, and he has passed through all these grades of work as well as that of bottle-blower.

Flint-bottle works—I am informed that the work of the bottle-finisher in these works is quite different, and that the heat is not nearly so great, because it is generated by coal fires, and not by gas and air. The flint bottle-finisher sits, in many cases, ten yards away from the furnace, and works at a small "glory-hole," into which he need never look. The bottle-makers of these works are therefore much less prone to cataract than those who make ordinary heavy glass bottles.

Pressed-glass works.—The work is similar to the flint-bottle maker. The metal is withdrawn from the furnace through the usual small aperture by the glass-worker, and carried to his bench three or four yards away, where he then presses it into the mould beside him. His work does not expose him to such glare and heat as the bottle-finisher endures. It resembles more the work of the "gatherer" and "blower," but the temperature of the furnace for pressed glass is not so high as for bottle manufacture. In these works the metal is "gathered" from "pots"—little troughs by the side of the furnace—which is also the case in flint-bottle works.

The Writer's Investigations.

My own enquiries were almost entirely restricted to investigating the lenses of workmen who were or had been employed at three ordinary heavy bottle works in the Sunderland district, although I have operated for cataract in a founder and a finisher from pressed-glass works. At first I wished to make a personal examinaton of all the men employed at one of the three factories, but the workmen refused to submit themselves to examination, because they dreaded they might be told they had cataract, and those whose sight was defective did not wish their condition to become known, lest they should be dismissed from their work. (Dr. Legge subsequently examined 87 of these workmen over 30 years of age and found that no less than 22 of them had cataract.) I had therefore to content myself for the most part with a full examination of those who had been disabled from working through cataract at these factories. The statistics obtained were far from complete, and I have no doubt that many more men with cataract would have been found had a full investigation been possible.

Summaries of cases of cataract observed in the three factories in the

Sunderland District.—At these factories about 400 men are employed, among whom there are 130 "finishers," 130 "blowers," etc. The "gatherers" also number about 130, but one-fourth of them are boys.

Number of men known to have cataract, 40, *viz.* :—

	Founders.	Blowers.	Gatherers.	Finishers.
Men at work (report very incomplete)	0	0	2	3
Of 23 superannuated men (who must be over 50 years to obtain superannuation)	0	0	1	15
Doing other work owing to cataract	0	0	0	11
Others disabled by cataract	0	0	0	8
Total	0	0	3	37

These figures prove the great frequency of cataract in bottle-makers, especially bottle-finishers, and are, I imagine, unparalleled in any other trade.

In 25 cases of cataract the age at which the sight began to fail was ascertained. The sight began to fail—

In 1 case between the ages of 21-30 years.
In 3 cases between the ages of 31-40 years.
In 13 cases between the ages of 41-50 years.
In 6 cases between the ages of 51-60 years.
In 2 cases between the ages of 61-65 years.

In other words, in two-thirds of these cases the eyes began to suffer from cataract by the age of 50 years.

As the cataract nearly always begins close to the posterior pole of the lens, and as the pupil is contracted by the bright light of the furnace, the disturbance of vision is often great, although some improvement in the sight may be affected by the use of atropine. In many cases, however, the opacity remains small and stationary for several years, so that the workman does not realise there is anything wrong and can go on with his work, as in the case of J.W., aged 48 years, who had posterior cortical cataract in both eyes for ten years and was still working as a "finisher."

In 21 cases the age at which disablement from work occurred was ascertained, namely :—

1 man was disabled between the ages of 41-55 years.
3 men were ,, ,, ,, 46-50 ,,
10 men ,, ,, ,, 51-55 ,,
4 men ,, ,, ,, 56-60 ,,
3 men ,, ,, ,, 61-65 ,,

In 14 out of 20 cases, therefore, disablement through cataract was brought about by the age of 55.

In 17 cases the number of years the workman was a "finisher" before disablement occurred was noted, namely :—

3 men were "finishers" for from 15 to 20 years.
3 men ,, ,, ,, 21-25 ,,
5 men ,, ,, ,, 26-30 ,,
6 men ,, ,, ,, 31-35 ,,

The number of years varied between 17 and 35 years, the average being 27 years.

In 16 cases in the above lists, in which the necessary figures are given, it appears that the time between the sight beginning to fail and the occurrence of disablement from cataract varies from some months up to ten years, the average being about three years.

Both eyes are almost always affected ; and the disease often begins about the same time in both lenses, although there may be a difference of some years between them in this respect. In the Yorkshire cases given below both eyes were affected in 33 out of the 37 cases.

The Glass Bottle Makers of the Yorkshire United Trade Protection Society.

The total number of members of the above society was 2,623 ; but of these only 1,341 were employed in December, 1909, as follows :—

	Men.	Apprentices.
"Finishers" (or bottle-makers) ...	447	—
"Blowers" ...	430	17
"Gatherers" ...	245	202
	1,122	219

The large number of hands unemployed (1,282) was due to the fact that the trade is a decaying industry in this country, owing to foreign competition. Among the unemployed, however, were 131 members incapacitated for work.

The area covered by the society includes the whole of Yorkshire, Blaydon-on-Tyne with 85 adult members, Newport in Monmouthshire with 91 members, and London with 29 members. In Yorkshire are included the works at Castleford, Swinton, Hunslet, Thornhill Lees, Knottingley, Wakefield, Barnsley, Conisbro', Masbro', Wombwell, Stairfoot, and Hull.

At my request, Mr. A. Greenwood, the Central Secretary, prepared a list of all the members who have been superannuated during the last nine years, numbering 114, showing their ages and the diseases which caused their permanent inability to work. All these men were examined by Dr. G. B. Hillman, of Castleford, who certified their condition. To be entitled to superannuation, a workman must have attained the age of 50 years, and be permanently unable to work at his trade.

So far as my inquiry was concerned, these statistics are very incomplete, because there are no figures available to show—

1. The number of men who are working and who have cataract.
2 The number of men who are disabled by cataract and are under 50 years of age.
3. Men who have left the trade for various reasons, including failing sight, and who have now cataract.

Of the 114 superannuated members (all necessarily over the age of 50 years), 37 or 32·4 per cent. had cataract, and all but one of these were incapacitated for work through the eye condition. There were :—

79 "finishers," 29 of whom had cataract, or 36·7 per cent.
26 "blowers," 4 ,, ,, ,, 15·4 ,,
9 "gatherers," 4 ,, ,, ,, 44·4 ,,
Total, 114 men, 37 ,, ,, ,, 32·4 ,,

I know of no other class of disabled workmen with such an unwonted prevalence of cataract.

Of the 37 cataract cases :—

11 were disabled between the ages of 50 and 54 years inclusive.
12 ,, ,, ,, 55 ,, 59 ,,
12 ,, ,, ,, 60 ,, 64 ,,
2 ,, ,, ,, 65 ,, 70 ,,

The average age of disablement was 57·3 years, but if those with cataract who were under 50 years of age were known and included, this average age would be reduced by some years.

In addition to the 37 with cataract, 11 others had other eye affections, making a total with eye diseases of 48 men, or 42 per cent. of the whole, namely :—

2 had traumatic cataract (not included in the above).
1 had a corneal ulcer.
3 had optic neuritis.
5 had other eye affections (hypermetropia, presbyopia, myopia, "failure of sight," and defective sight).

Form of the cataract in its earliest stages.

A perusal of the details of my 40 cases mentioned above shows that in 16 cases the disease was seen in its early stages, and in 13 of these it was found that it was posterior cortical in form, and in only 3 was it beginning in one of the ordinary senile forms as peripheral radial sectors. It is true that in 2 of the posterior cortical cases there were radial sectors, namely, in 1 case one sector and in another two. Considering the ages of most of these men it was to be expected that some of them would show signs of an ordinary senile form of cataract. In none of these early cases was a perinuclear development noticed.

When both lenses in a patient were seen in an early stage of the disease, the form of the cataract was identical in both.

The opacity first appears at the posterior pole of the lens, immediately under the posterior capsule, and is often irregularly disc-shaped. By oblique illumination it is distinctly brass-coloured. The outline of the disc-like part is well defined, but the opacity is less dense and shades off towards the equator. As the haziness spreads, it at first clings closely to the posterior capsule, so that it is saucer-shaped in the earlier stages of the disease, the concavity of the posterior capsule of the lens being easily seen by oblique illumination. By direct examination with a *plus* 10D. lens, the central disc is sometimes seen to be not completely opaque, the opacity often presenting an irregular network appearance within an irregular circle; and the surrounding less dense opacity is often like a cobweb. From the posterior pole the cloudiness and opacity gradually spread to the rest of the cortex, and when the cataract is ripe, the lens has a pearly hue.

In the later stages of development the cataract cannot be distinguished from the ordinary senile forms.

Bottlemakers' cataract thus differs from the way in which ordinary senile cataract generally developes, namely, (1) as lines or sectors (radii) from the equator of the lens; or (2) as opaque layers surrounding the sclerosed (but clear) nucleus; or (3) as small milk-white opacities scattered throughout the cortex; and (4) in two of these ways at the same time. An ordinary senile cataract may rarely begin as a posterior cortical cataract; for I recently saw such a form in a quarryman, but so far as I know, it is a rare form, whereas nearly all cases in bottle-finishers begin in this way.

A posterior cortical must not be confounded with a posterior polar cataract, the former being a progressive disease of the lens substance, whereas the latter is a mere dot on the centre of the posterior surface of the lens capsule and represents the remains of the hyaloid artery, when that vessel does not disappear completely; it is a congenital and stationary affection.

My observations have since been confirmed by Sanitatsrät Dr. E. Cramer, of Kottbus, in a paper "On the Origin and Clinical Peculiarities of Glassblowers' Cataract" in the *Klinische Monatsblätter für Augenheilkunde*, January, 1907. He states that the earliest appearances of cataract in these workers are always to be observed in the posterior polar region and always within the pupillary area. Dr. T. M. Legge also confirms my observations in this respect. *(Vide infra.)*

Is the disease a primary or a secondary cataract? From the site in which the opacity first occurs it resembles an ordinary secondary cataract, but in the latter the opacity is due to a failure of nutrition in the lens which is brought about by disease of the vitreous, choroid, or retina. It is therefore frequently found in the young, and after its removal, the sight is still bad. Moreover, the form of secondary cataract is at first rosette-shaped or stellate, its centre corresponding to the posterior pole of the lens, while its rays are directed radially towards the periphery. Glass-worker's cataract, on the contrary, is not associated with any other disease of the eye, except perhaps some disturbance of the retinal pigment, for the retina is generally tessellated, and Dr. G. J. Burch found that some bottle-makers were defective in recognizing violet. After removal of the opaque lens, the sight is usually good, although the finisher is rarely able to resume his old employment, owing to the loss of accommodation.

For these reasons I believe the cataract to be a primary one.

Dr. T. M. Legge's Researches.

Dr. Legge examined the lenses of workmen in five factories for the making of glass bottles, in one for sheet glass and one for pressed glass; these works were situated in St. Helen's (Lancashire) and in Sunderland, Seaham Harbour, and Gateshead (Co. Durham).

He examined in the Sunderland district the men who are still at work in the three bottle factories from which came the men, mainly bottle-finishers, who had ceased work and whom I examined and have reported upon above. He states he could not have seen more than two or three of the forty cases included in my lists, and of the 28 cases of bottle-makers' cataract operated upon in the Sunderland Eye Infirmary between 1902 and 1906, he had seen only one. In the three Sunderland factories he found in 87 workmen, over 30 years of age, no fewer than 22 cases of cataract, *viz*—

In 39 workmen between 30 and 40 years of age 6 cases of cataract.
In 27 ,, ,, 41 ,, 50 ,, ,, 5 ,, ,,
In 17 ,, ,, 51 ,, 60 ,, ,, 8 ,, ,,
In 4 ,, over 60 years of age 3 cases of cataract.

He found, however, cataract to be more frequent in the glass factories of Durham than in those of Lancashire.

Altogether, he examined the eyes of no fewer than 513 persons exposed to furnace glare in glassworks, and, for purposes of comparison, of 278 persons not so exposed. He found that all classes of glass-furnace workers appeared to suffer, and that in them, between 30 to 40 years of age, opacities of one kind or another in the lens were about 5 times, between 41-50 about twice, and at 51 years of age and over, more than three times as frequent as in those engaged in other work. The difference in the character of the changes observed was very striking and of unmistakable significance. Thus, of the control persons examined, none had sought treatment for cataract, and in not more than three were the opacities such as to impair sight. Among the glassworkers, in addition to six, in whom a single extraction for cataract had been performed, and in one a double extraction, there were at least twenty-five others in whom the sight of one or other of the eyes was seriously impaired.

Typical central posterior cortical change of varying degree was noted in fifty-six lenses of the 513 glassworkers and in two of the 278 control persons examined.

Approaching the problem from another side—that of superannuation from disablement by cataract—it was found that useful comparison could be made between the reported incidence of the malady on 10,549 members of the Hearts of Oak Benefit Society in receipt of reduced sick allowance and that on 186 superannuated members of glass-bottle-makers' societies. The percentage of cataract in the former was only 0.78, and in the latter 22.6, although the average age in both was about the same—56 years.

"The conclusion thus indicated is confirmed by the evidence of the witnesses who appeared before us. Special attention may be drawn to the medical evidence given on behalf of Messrs. Pilkington Brothers, a firm of glass manufacturers at St. Helen's employing some 4.000 workpeople. From that it appears that about one-half of these workpeople are exposed in the course of their work to the glare of molten glass, and that about one-half are not so exposed. Each half contributes equally to the number of cases of ordinary sickness, which are assisted by the Sick Club attached to the works. But all the cases of cataract which have come within the cognizance of that club, have been from among the one-half of the men who are exposed to the glare and none have come from the other half." (Supplementary Report of Departmental Committee.)

"The enquiry establishes the fact, I think, that persons exposed to incandescent molten glass or to continual furnace glare in the flattening of glass, suffer unduly—more than ten times as frequently as other people—from cataract."

Dr. Legge found that all classes of glass-workers who were exposed to incandescent molten glass appeared to suffer and the differences which were noted in the incidence of those making sheet glass, glass bottles, and pressed glass were not sufficiently striking to make it necessary to consider distinction between them.

As to the form of the cataract in its early stages Dr. Legge states :—"When viewed with the ophthalmoscope by the indirect method, the characteristic change in the lens of the glass-worker is opacity of the posterior cortical layers (like a blot of ink) of varying size, within the pupillary area. Changes in the posterior layers were present, indeed, in over half of the positive cases. In the control population examined the characteristic change was the appearance of peripheral striæ around the margin of the lens, the central pupillary area remaining perfectly clear. There was exception to this in two cases which could not be distinguished from the condition observed in glass workers. The occupation of one of these had been constant attendance for twenty-five years at an annealing furnace—work in many respects similar to that of a glass-flattener. The second was a man, aged 60, a foreman, the sight of whose right eye had been known to be defective for a great number of years.

"The left eye was shown to be affected rather more frequently than the right."

Ætiology.

From the facts already stated, it is quite certain that glass-workers' cataract is caused by the exposure of the eyes of the workmen over a period of years to the radiations from the highly incandescent molten glass. Hence, the frequency of cataract in glassworkers is in proportion to :—

(1) The heat from the glass, which varies in different factories and in different classes of works ;

(2) the degree of exposure to which the eyes of the different classes of workmen are exposed to the glare ; and

(3) the length of time, each day, and the number of years, during which the various grades of workmen look into the tanks.

Therefore, in heavy glass-bottle works the " bottle-finishers " suffer by far the oftenest; next comes the " gatherer," who is succeeded by the "blower" and the " founder "; whilst the rest of the employés are not affected at all. The light flint-bottle makers and pressed glassworkers are not affected with cataract nearly so often as the heavy bottle-makers (*Vide supra*). Iron-workers and blacksmiths, whose eyes are also exposed to great heat, suffer from cataract in proportion to the degree of heat and length of exposure of the eyes at their trades.

Which are the rays of radiant energy that produce this cataract? To answer this question we must consider some of the elementary principles of the physics of light.

The Physics of Light.

We know that radiant energy or light, using the latter term in its wide sense, consists of rays whose waves vary in length and in the rapidity of their vibrations. Physically, except for these variations, the rays are identical in character, and all are subject to the same laws of refraction when they fall upon the eye. The wave-lengths of these rays are expressed in Ångström units (one Å.U. = one-ten millionth part of a millimetre = $0 \cdot 1\ \mu\mu$), and the Greek letter λ is used for the term " wave-length." The wave-lengths gradually increase in length from λ 1,000 (1,000 Å.U. or $\mu\mu$ 100) up to λ 600,000 (= 0·06 mm.). According to the length of the wave, when rays fall upon the eye, they produce different physiological effects. Rays between λ 3,970 and λ 7,230 produce the sensation of light, using this term in its narrow sense of visible or luminous energy; whilst rays shorter than λ 3,970 are invisible and are actinic—producing chemical changes or are ionizing (*i.e.*, they enable the air through which they pass to conduct electricity); and rays longer than λ 7,230 give rise to the sensation of heat and are also invisible. (See Diagram I.) Whilst the physical series of rays is mathematically uniform, the physiological manifestations overlap and vary according to the nature and condition of the recipient organs. For example, a ray of sunlight which appears as white light, when passed through a transparent prism, appears to the eye as red, orange, yellow, green, blue, and violet in order, forming the visible spectrum, the red having the longest and the violet the shortest wave-lengths. The visible spectrum extends from about λ 7,230 at the red end to λ 3,970 at the violet end. Beyond the red end the waves extend up to λ 600,000 and beyond the violet end to λ 1,000. Most people can see only from λ 7,000 to λ 4,000. It must be remembered also that whilst the ultra-violet rays are specially powerful chemically, the " visible " rays are slightly actinic also, and the infra-red are so in still less degree. In the same way whilst the infra-reds are very hot, the longer visible (red) rays cause also a slight rise of temperature.

Whilst a photograph of the spectrum may give a complete analysis of the light, it varies with the sensitiveness of the film to particular groups of waves. Sir William Abney, therefore, invented specially sensitized films which will photograph the infra-red waves. Glass prisms and lenses show the visible spectrum only, because glass absorbs the ultra-violet rays and much heat. To show the full extent of the spectrum quartz lenses and prisms must be used. The eye itself is a physiological spectrograph, the media of which possess special absorptive faculties, and its retina is a sensitive film having special analytical properties.

Artificial lights (amongst which incandescent glass or metal must be

DIAGRAM of the SPECTRUM

NOTE :—λ600,000=wave length of 0·06 mm.

λ600,000

These do not penetrate the eye at all

λ23,000

Few of these rays reach the retina ; nearly all of them are cut off by the cornea ; a few are cut off by the lens.

INVISIBLE
INFRA-RED,
or
HEAT RAYS.

λ13,500

The iris of the ox absorbs all heat rays which fall upon it (H. Hartridge and Hill)

75% of these rays falling on the cornea, reach the lens through the pupil, but only about 12% are absorbed by the lens (and, when intense, may damage it, as in posterior cortical cataract).

Of the rays absorbed by the lens most of them lie between these wave-lengths

λ11,000

Nearly all these rays reach the retina.

λ7,230

λ7,200

Spectacles should cut off rays longer than these

RED.
λ6,470
ORANGE.
λ5,850
YELLOW.
λ5,750
GREEN.
λ4,920
BLUE.
λ4,550
INDIGO.
λ4,240
VIOLET.
λ3,970

VISIBLE SPECTRUM.
These rays, when intense, damage the retina, as in "eclipse-blindness."
Most people can only see λ7,000 to λ4,000.

These rays reach the retina, and may, if intense, damage it.

λ3,550

Spectacles should cut off all rays shorter than these

λ3,500

The lens cuts off all rays shorter than these, and some of the longer up to λ4000.

These rays are absorbed by the lens, and may damage it.

λ3,100

INVISIBLE
ULTRA-VIOLET,
or ACTINIC RAYS,
i.e., Chemical and
Ionizing Rays.

λ3,000

Ordinary spectacles cut off all rays shorter than these

λ2,950

The cornea cuts off all rays shorter than these

These rays, when intense, cause the conjunctivitis, corneitis, and iritis of certain photophthalmias.

λ2,900

DIAGRAM I.

λ1,000

(λ1,000=0·0001mm.)

included) vary in the length of rays they emit, *e.g.*, some give off more ultra-violet rays than others, some are poor in red and yellow rays, etc. If a substance is warmed it gives off the longest heat waves, those whose wave-length measure 0·06 mm. being first emitted ; when its temperature reaches 500° the longest visible (red) rays appear, and at about 1,000° it appears as a white light and ultra-violet rays are given off. The heating effect of luminous rays is very small compared with that of the invisible infra-red rays ; and most transparent substances transmit the shorter rays and absorb the longer. Hence, most artificial lights emit heat rays which are least absorbed by water and by the media of the eye.

Absorption of radiant energy by the media of the eye.—Energy transmitted by a substance does no work upon it and therefore cannot alter its physical state ; but energy absorbed by a substance, becomes some other form of energy and may produce changes in the physical state of the substance. Radiant energy undergoes partial or complete absorption in its transmission through the eye, *e.g.*, the pigment in the iris and in the retina absorbs the light transmitted to it ; and if the rays are very intense damage may be inflicted on the iris or retina. All rays which are absorbed give rise to heat.

By experiment E. K. Martin found that all the dioptric media of the eye are uniformly permeable to rays *between* λ6,600 *and* λ3,900 ; that all *the ultra-violet rays* shorter than λ2,950 are completely absorbed by the cornea, that all those shorter than λ3,500 are completely absorbed by the lens, though the line is not a sharp one, absorption beginning about λ4,000 ; and that a layer of vitreous 3/16 of an inch thick showed a broad, ill-defined absorption band between λ2,800 and λ2,500 (maximum at λ2,700). From these facts one would expect the cornea to be damaged by the ultra-violet rays it absorbs, and such is the case when these rays are intense.

Researches as to the transmission and absorption of *heat rays* have given discordant results. The most recent are those of H. Hartridge and Hill who by careful experiments with a spectrometer, modified for the purpose, have confirmed the statement of Aschkinass, that no considerable difference exists between the absorption bands of the eye and those of water, whose absorptive properties had been worked out previously. They found, by experimenting with the eyes of an ox, that 5 per cent. of the heat waves are lost by reflexion from the surfaces of the various media and by scattering ; that rays from λ11,000 to λ7,000 pass into the eye almost unchecked, a great deal of it reaching the retina, as Vogt had also found ; that the iris obstructed all the heat radiation which fell upon it, roughly 75 per cent. of the rays between λ13,000 and the visible spectrum ; that most of the wave-lengths from λ13,000 to λ23,000 were cut off in increasing, and much greater proportion, and chiefly by the cornea ; and that the lens absorbs approximately only 12 per cent. of the rays which reach it (*viz.*, 75 per cent. of those between λ13,000 and λ7,230 which fall on the cornea). See Diagram 2. The most penetrating rays are those just beyond the red. Rays from λ23,000 to λ600,000 do not penetrate the eye.

We are now in a position to discuss the question :—

Which are the rays given off from the incandescent glass which cause the opacity in the lenses of glass-workers?

I. Sir William Crookes has confirmed the observation of the late Dr. Burch that no X-rays are emitted from intensely hot melted glass. It therefore follows that *X-rays cannot be the cause of glass-workers' cataract.* The wave-lengths of X-rays, which are a form of radiant energy, are extremely short and measure from 2 to 5·5 parts of one hundred millionths of a millimeter, *i.e.*, λ·2 to λ·55 (Russ, *Lancet*, 17th April, 1915).

II. *The ultra-violet rays do not cause the disease*, because :—

(*a*) Sir William Crookes found that few of these rays are given off from the bottle-makers' tank. Even after an exposure of three hours to the highest heats (2,500°F) the impression on his special spectrograph did not extend much into the ultra-violet end. A photograph, after 20 minutes exposure, included λ4,520 to λ6,900; and after one hour's exposure λ3,640 to λ7,600; and after three hours' exposure λ3,340 to λ7,800.

(*b*) The ultra-violet rays absorbed by the lens are those between 3,500 and 3,000, a comparatively small number, and it is only these rays which could damage the lens. Waves shorter than 2,950 are stopped by the cornea (See diagram 1).

PERCENTAGE OF HEAT ABSORBED BY CORNEA, LENS, AND IRIS.
(H. Hartridge & Hill.)

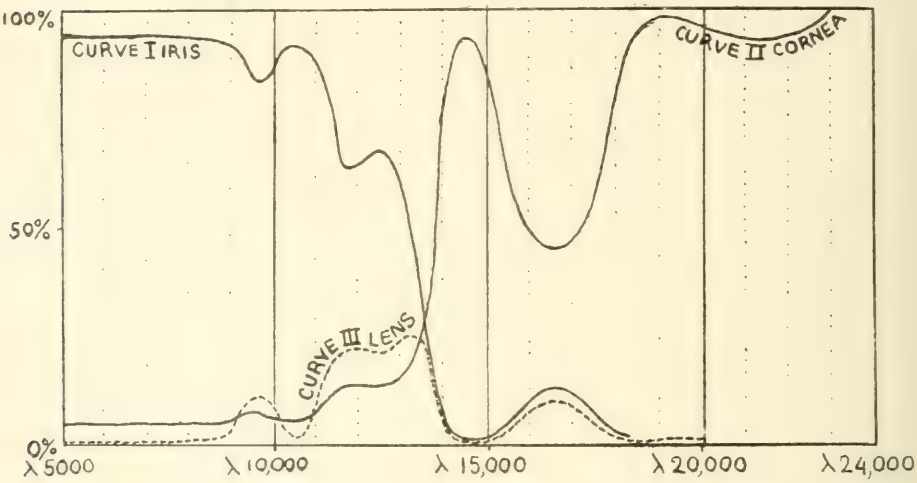

DIAGRAM 2.

(*c*) The photophthalmias caused by ultra-violet rays are set up by exposure of the unprotected eyes to intense glare from snow, the surface of the sea, powerful electric lights, Finsen light, and Mercury vapour lamps; they are all characterised by intense photophobia, lacrimation, reflex blepharospasm, ciliary neuralgia and in severe cases, corneitis and iritis (corresponding to sunburn of the skin), and they are found to be due to intense rays between λ3,100 and λ2,900. No similar condition is ever seen in bottlemakers.

(*d*) By experiments E. K. Martin found (with one exception) no change in the lens or its capsule as the result of long-continued exposure to rays of short wave length (*Proc*: *Royal Soc*: B. Vol. 85, 1912). These results agree with those of Birch-Hirschfeld (*Arch. f. Oph.*, 1909, Vol. 71, No. 3). The exceptional case of Martin presented no changes comparable to a posterior cortical cataract.

III. That *the luminous rays are not the cause* of the cataract may be inferred from the following considerations, in spite of the fact that these rays are so brilliant that at the founder's end of the tank it is difficult for the unprotected eye to make out any details of the surface of the molten glass, although at the working end it is easier to see the seething mass :—

(*a*) No dazzling, no blinding and no retinal scotomata occur in bottle-makers, such as is seen in eclipse-blindness and after exposure of the eyes to extremely brilliant luminous rays, and

(*b*) Conversely, exposure of the eyes to these bright lights has never been known to cause cataract. As practically all luminous rays pass through the lens unimpeded, they cannot cause any change in the structure of the lens.

(*c*) The "bottle-finisher," whilst finishing one bottle, looks into the tank for three seconds only, and then looks away from it for 21 seconds. This short exposure, followed by a comparatively long rest, may account for the absence of the usual effects of glare on the eyes.

It has been suggested that the great frequency of cataract in India may be due to the bright glare of the sun. But Lieut.-Col. R. H. Elliot tells me that the great frequency of the disease is apparent only, and not real (except perhaps in the Punjab), and is accounted for by the fact that its 320,000,000 inhabitants until recently were served by only four or five Eye Hospitals. There are, of course, individual operators. Nor is the disease specially associated with the great prevalence of diabetes in that country. Moreover, the form of the opacity is of the ordinary senile type, and does not begin in the posterior cortex of the lens.

We may say, therefore, that the intensely luminous rays from the tanks are not the cause of the cataract, although, as these brilliant rays are known to be harmful to the eye, I suggested in my previous papers that the protecting spectacles should be dark-coloured.

IV. That *the heat rays* (*infra-red*) *are the cause of cataract* is evident from the following facts :—

(*a*) The heat rays coming from the tank heated up to 2,000° to 2,500°F. must be very strong. Sir William Crookes found them with his spectrograph to be very intense, and in far greater abundance than the ultra-violet radiations.

(*b*) For a century it has been known that cataract is common in workmen whose eyes are exposed to great heats, *e.g.*, blacksmiths.

(*c*) It has been shown above that the cataract is due to the rays from the incandescent glass, and that neither the ultra-violet (which include the X-rays) nor the luminous rays produce it ; therefore, by the process of exclusion, the infra-red rays must be the cause of the disease.

(*d*) H. Hartridge and Hill have shown that the iris cuts off all the heat rays which fall upon it, and the pupil being contracted by the bright light, the periphery of the lens is sheltered from the harmful rays, and thus escapes damage for a longer time than that part of the lens behind the contracted pupillary area. The intense heat (and light) rays falling on the lens through the contracted pupil are refracted by the cornea and the lens, and become more concentrated near the posterior pole, where, in addition, some of these rays are reflected from the concave posterior surface of the lens. There is thus a double concentration of heat at the very spot where bottle-makers' cataract first shows itself. Do not these considerations show that the cataract is the direct effect of the absorption of some of these rays leading to structural change in the lens? This change may be a slight shrinkage from drying, whereby a partial separation of the capsule takes place at the posterior pole, which would also account for the peculiar shape of the cataract. We have seen that the lens absorbs a comparatively small amount of heat radiation, but the researches of Chick and Martin have shown that an actual coagulation of the lens proteins may take place in the course of time by this small amount of heat (*Journal Physiol.*, 1910, Vol. XL, p. 404).

Parsons suggested that the change in the lens is due to the heat absorbed by the iris setting up changes in the ciliary body by which the secretion of aqueous is deranged and nutritional changes in the lens set up. But of this there is, as yet, no evidence ; and, indeed, the absence of any apparent change in these structures is very remarkable considering the amount of heat the iris must absorb in the bottle-finisher. This shows how admirably the iris does the work for which it was designed.

It is to be admitted that in all the experiments on the effects of heat rays hitherto made it has been impossible to exclude altogether the influence of luminous rays ; and that as yet no experiments have been made which prove that a posterior cortical cataract can be set up by the prolonged action of heat rays only on the eye of any animal. Notwithstanding these considerations, there can be little, if any, doubt that it is to the infra-red rays that glass workers' cataract owes its origin.

Prevention.

In my former papers I recommended that the workmen should wear dark-coloured spectacles or goggles whilst at work, because glass has the property of cutting off much of the heat radiation and nearly all of the ultra-violet rays ; and if the glass be dark-coloured, many of the luminous rays are also intercepted. This recommendation has been carried out by a number of the men, some using dark-blue and others dark-smoked goggles. A certain amount of condensation of moisture on the glasses from the excessive sweating of the workman was troublesome before he got used to it. To prevent it a "lasin" pencil (a kind of soap) was smeared over the glasses, but this is no longer used.

I have been told that in some continental works a square of thick glass hangs in front of the hole through which the bottlemaker looks into the furnace. In some such way, or by structural alteration of the holes, the men may be enabled to obtain the metal from the tanks without their eyes being exposed so much to the glowing sea of glass.

The most effectual preventive will be the adoption of the American bottle-moulding machine, for by its use the eyes of the men are not exposed to the intense heat and light of the tanks. Two of these machines, although excessively costly, have, I am told, been set up in this country.

In the meantime, the workmen should use dark-coloured spectacles ; the amount of heat and light which these will cut off varies with the composition of the glass and its thickness.

Since 1909, Sir Wm. Crookes has been experimenting by mixing numerous metallic oxides in different proportions with the constituents of glass, in order to discover the best kind of glass to protect the eyes of glass-workers. He had 300 samples of glass made in this way. For the glass-worker No. 217 is the most efficient. It consists of:—fused soda flux 96·80 per cent. ; ferroso-ferric oxide 2·85 per cent. ; carbon 0·35 per cent. The glass is of a pale-blue colour with a tint of green and colour-matches are little affected by it ; it cuts off 96 per cent. of the heat radiation and all ultra-violet rays shorter than $\lambda 3550$, and transmits 40 per cent. (H. Hartridge and Hill say 50 per cent.) of light. Spectacles made of this glass are said to be pleasant to use. In the tintometer the numbers are yellow 2·0, blue 8·0. H. Hartridge and Hill found Crookes' glasses to absorb more infra-red rays than any others which they tested. Crookes advises grey or neutral tints, because they do not alter the natural colours of objects and are a great relief to the eye. Unfortunately, at present, for commercial reasons, Crookes' goggles suitable for glass-makers are practically unobtainable.*

See "Protective Goggles for Workmen" in the *British Medical Journal* of August 28th, 1915, [illegible]

DIAGRAM TO ILLUSTRATE THE AMOUNT OF RAYS CUT OFF BY VARIOUS SUBSTANCES AND CERTAIN STRUCTURES OF THE EYE. (H. Hartridge).

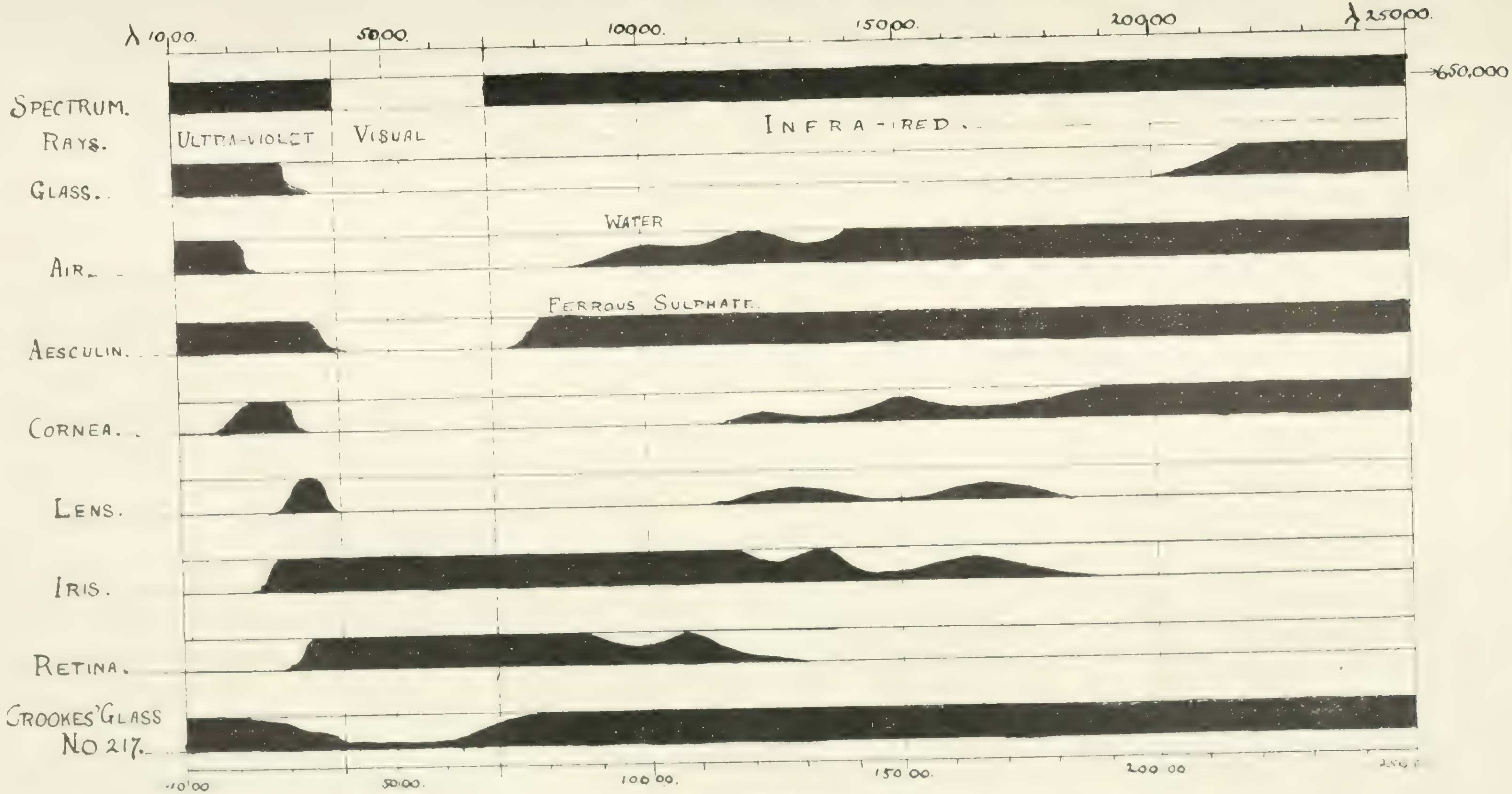

DIAGRAM 3.

Crookes' glasses A. and B., which are on the market, are for ordinary persons to use who wish to save their eyes from glare. They cut off about one-third of the heat, and nearly all the ultra-violet rays. 'A.' transmits nearly all the light and 'B.' about 83 per cent. of it. They are costly and not suitable for bottle-makers.

Whilst Crookes has had glasses made which will cut off nearly all the infra-red rays, and others again which will transmit almost all the luminous rays, he has not yet succeeded in making an ideal glass which will intercept all the heat and actinic rays and allow the luminous rays to pass unhindered. His experiments are of great importance because they will be also of use in showing what are the best kinds of globes with which to surround harmful artificial lights, a subject to which little attention has hitherto been paid. All these experiments have been made by Sir William Crookes solely in the public interests.

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SOME OCULAR EFFECTS OF PLUMBISM,*

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ENGLAND.

I do not propose to occupy your time with a survey of all the effects of lead poisoning, but merely to give a short account of my own cases where there were no gross fundus changes, but where it was fairly certain that the symptoms were due to the effects of lead.

Judging from the official returns, medical men are somewhat loath to certify patients as suffering from lead poisoning until the symptoms have become very grave, and the prognosis consequently unfavourable. During the year 1914, twenty-two cases of lead poisoning were certified, with ten deaths. In the Potteries area it is no uncommon thing to read reports of inquests at which the diagnosis of lead poisoning was made for the first time at the *post mortem* examination. If ophthalmology can help in the early recognition of this disease, and by means of timely warning, particularly as to change of occupation, limit the disease to its early effects, much suffering will be saved the workers and the manufacturers also will be saved much money.

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* Read at the Oxford Ophthalmological Congress on July 16th, 1915.

My series of cases includes all classes of lead workers, from "dippers" to "paintresses." Their symptoms have been very varied. At first I blamed ametropia as the cause of all the trouble, but the lack of success of treatment by glasses and the persistence of the symptoms until the patient gave up work, led me to look to other troubles as the cause. As a rule, the patient complains of headache, which is described as "general, "full," or "sickening." Sudden development of mistiness and the appearance of "cobwebs" before the sight are amongst the more common complaints.

Of twenty-two of my cases of which the diagnosis has been confirmed by symptoms other than the eye ones, I have been able to follow up sixteen. All showed at one time or other a contraction of the visual field of from 5° to 25°. More remarkable than the contraction was the fact that it varied in every case, apparently having an intimate connection with the acuity of vision and with the degree of headache.

Three showed a central scotoma for red and blue.

Seven showed a relative scotoma for blue.

Ten showed a contraction of the field for blue, and of these, three showed an actual interlacing of red and blue.

Three had paresis of the external rectus, and nine had deficiency of accommodation.

I have said that there is no gross lesion of the fundus, but if the retina be examined frequently and especially immediately after severe headache or sickness, it will be found that there is a considerable variation in the appearance of the retina. At one time the choroidal vessels may be seen quite clearly. The edge of the disc and the lines of the retinal vessels may be seen distinctly, then, perhaps on the next day, the choroidal vessels may disappear, the retina seem swollen and hazy, and the vessels become indistinct. I cannot say that the vessels become congested; indeed, on the whole, the arteries seem smaller than usual. As a rule, the extent of the field is in proportion to the œdema of the retina—the more opaque the retina the more contracted is the field. In some of the more severe of my cases, where there were attacks of sickness with the headache, I found in some that there was a decided increase of blood pressure during an attack. I have taken the intra-ocular tension with the Schiötz tonometer in ten of these cases, but I was not able to find any increase.

The following case will probably give a good idea of the general course:—H.M., aged 42, certified 14 months, sent to me because he could not read small print. He complained of occasional bouts of sickness preceded by colic. For a few days after each attack he noticed that his vision was "foggy." Smokes one ounce of "Bruno Flake" per week. I found no lesion of the fundi; his vision, with glasses, was 6/12 in each eye. He had a central scotoma for red, blue, and green. His field for form was contracted 10° in each eye. I saw him ten days later; he had been sick that morning for two hours. I found that his vision was reduced in the right eye to 6/60 and in the left to less than 6/60. The fields were contracted 30°. Nasally and below in each eye there was a sector-like defect reaching to the fixation point. The central scotomata were, if anything, slightly enlarged. There was no gross lesion of the fundus, but there was distinct retinal irritability, and the retina appeared hazy and œdematous. The choroidal vessels, which had been clearly seen, were now imperceptible. The disc edges were blurred and indefinite. I saw him on the following day, but there was practically no change; but three days later, his vision had improved to 6/12, his fields were only contracted 10°, and the sector scotomata had disappeared. I have seen him soon after three other attacks, and have found practically similar conditions in each. During his "quiet" periods his blood pressure averages 135 mm., but immediately after an attack of sickness, it is increased by about 20 mm. as a rule. I have never found any increase in the intra-ocular pressure. I have followed this man's case for more than twelve months, and have not found any permanent loss of vision or any permanent contraction of the fields, although there is always a marked temporary contraction, lasting from two to seven days. His visual acuity is practically in direct proportion to the extent of his fields. His colour fields and scotomata do not vary much.

I have given the history of this case, as it shows very well the different phases met with in these cases—phases which apparently depend entirely on vascular changes, and are not associated with neuritis.

I find that so long as the patient continues work in the lead process the symptoms persist, no matter how vigorous the treatment; but when the occupation has been changed to a non-lead one, and the blood pressure reduced, there is a gradual disappearance of all symptoms.

NYSTAGMUS CASES AND ELECTRIC LAMPS.[*]

Communicated by R. J. COULTER, D.O. (Oxon).,
Newport, Mon.

The following letter is from the Manager of a group of Welsh Collieries employing 2,600 *men*:—

SIR,—We have had 102 cases of nystagmus certified by the certifying surgeon, but a far greater number of men, anxious to avoid going on compensation, have appealed to us direct or through their doctors for electric lamps, and after being supplied, have been able to continue working; in fact, some will go as far as to say that their eyes are improving.

We introduced electric lamps into the collieries on a small scale in June, 1912, but only gave them to men whom we knew were suffering with their eyesight. A number of cases doing surface also returned to their old work underground with electric lamps and are still working. Since then we have gradually increased the number of lamps, but are still adopting the policy of only giving lamps to those who complain that their eyesight was failing. (The reason why we have not introduced them into the collieries wholesale is because we wanted to benefit by experience, and have the best possible lamp with the very latest improvements.)

The following cases were certified by the certifying surgeon as suffering from nystagmus, and unable to follow their employment on the dates given, but were given electric lamps, which enabled them to continue working, and they are still working:—

Name.	Occupation.	Date certified.
A.	Collier	October 1st, 1912.
B.	do. (recently joined the Army).	June 17th, 1913.
C.	Shackler	May 2nd, 1913.
D.	Collier	October 21st, 1913.
E.	do.	October 23rd, 1913.

There are many more cases, some more recent, but I have given the above illustrations to show that they have been able to continue working for long periods with electric lamps, even after having been certified as unfit.

Read at the Discussion on "Industrial Diseases and Accidents" at the Oxford Ophthalmological Congress on July 16th, 1915.

With ordinary safety lamps, colliers usually carry them about a good deal, either in their teeth or suspended from their belts, but with electric lamps the light is sufficient (particularly so if the collier and his assistant have an electric lamp each) if the lamps are hung up on the side of the stall roads.

A collier must keep his lamp at least 2 feet away from the swing of the pick, which means that the light is at least 6 feet to 8 feet away from the object upon which he is working.

From experience gained in dealing with cases of nystagmus, we have come to the conclusion:—

1st.—That insufficient light causes nystagmus.

2nd.—That the introduction of electric lamps has enabled scores of our workmen to continue working underground.

3rd.—That the use of an electric lamp is a good preventative of nystagmus.

It is, of course, only fair to say that we have had a few cases fail work even after giving them an electric lamp, but those have been cases where the men had got into a very bad state before complaining.

Six of our cases of nystagmus have joined the Army. One case, certified by the certifying surgeon on October 19th, 1914, and considered a bad case, joined the army on November 28th, 1914, just six weeks after being certified as unfit for work.

We have cases where colliers have failed to do their own work, but were able to do other underground work, such as haulier's work, and at the same time we have had hauliers unable to do their own work as hauliers. Only recently we had a timberman apply to us for work as a collier, because his eyes were too bad to do timbering (repairing) work, and we have had other cases where colliers, hauliers, etc., have failed to work underground, but are working by night on our surface rubbish tips, which is very dusty work, particularly so in rough weather, as our rubbish tips are up on the side of the hills.

We are sending you the two "Oldham" lamps, one dirty after a shift's use, the other cleansed and charged, ready for a shift's use; also the two oil lamps, one dirty after a shift's use, and the other cleaned, ready for a shift's use; and shall only be too pleased to assist you in any way we can, but much prefer that our name should not be mentioned.

July 13th, 1915.

PROGNOSIS IN COAL MINERS' NYSTAGMUS.[*]

BY

ALFRED C. NORMAN, M.D.
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THE question of prognosis in coal miners' nystagmus is so intimately associated with certain ætiological factors that I must ask your indulgence for a few moments while I digress beyond the strict confines of the subject allotted to me.

Everyone knows that, in order to see an object clearly, the eye must be so directed as to cause the image to fall upon the most sensitive part of the retina—the fovea centralis. This is called "central fixation."

Because it is such an every-day phenomenon one is apt to forget the exceedingly complicated system of muscles and nerves with which we are provided, in order to ensure perfect binocular central fixation. When, however, some link in the chain becomes strained or gives way, and we are called upon to investigate a case of heterophoria or diplopia or nystagmus, it is brought home to us that the fovea measures but a small fraction of a millimetre, and that, in order that each eye shall receive the image of an object precisely upon its fovea, we are endowed with twelve extrinsic ocular muscles, six cranial nerves with their nuclei, various higher association centres, and probably a supreme controlling centre which co-ordinates the functions of all the others.

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[*] A contribution to the discussion on "Industrial Diseases and Accidents" at the Oxford Ophthalmological Congress on July 16th, 1915.

Infantile Nystagmus.

Children are not born with the function of binocular central fixation already developed. Some of the association centres are, however, developed before birth, for the searching movements which a newly-born infant makes with his eyes are bilaterally co-ordinated, but the fixation centre has to be educated gradually.

The necessary stimulus for the education of this centre is undoubtedly a sharply defined image on the retina. If the child be born blind, he never gets nearer to central fixation than the already mentioned searching movements. If he be born with *bilateral* visual defects which cause his retinal images to be badly defined, or if he acquire these defects shortly after birth, then he never achieves perfectly the function of central fixation, but arrives at a compromise between his original searching movements and true central fixation. Such a compromise we term *infantile nystagmus* and many varieties are met with between the two extremes just mentioned, depending upon the degree of visual defect. This form of nystagmus we see every day in cases of congenital cataract, corneal opacity, chorioiditis, albinism, high degrees of astigmatism, etc., etc. It is due to *imperfect development of the function of central fixation.*

Nystagmus developing in later life.

In order to maintain central fixation, it is not only necessary that there be perfect control of the individual ocular muscles, but there must also be perfect co-ordination of the various centres and tracts that govern *groups* of muscles and so produce associated movements of the two eyes. These centres and tracts, then, are obviously governed by a special centre—the fixation centre. This is a reflex centre stimulated by visual impressions, *i.e.*, we voluntarily direct our eyes towards an object we wish to see, but the delicate operation of bringing the image accurately upon the fovea of each eye is a reflex action carried out by the fixation centre.

A weakness in any link of the chain between the highest brain centre and the eyeball tends to throw the mechanism out of gear and gives rise to various motor anomalies familiar to the ophthalmologist. Of these we are concerned at present only with nystagmus.

Any of the following conditions arising in later life may produce nystagmus : (1) actual damage to the brain centres or tracts, as seen in disseminated sclerosis ; (2) temporary poisoning of the centres or tracts by ether, alcohol, the influenza toxin, etc. ; (3) indefinite visual stimuli, as in cases of corneal opacity, high astigmatism, and the like ; (4) undue fatigue of groups of muscles, paralysis of certain muscles, or even tenotomy of an individual muscle ; (5) unusual stimuli to the higher centres by way of the vestibular nerve, *e.g.*, syringing the ear, rotating the patient on a turn-table.

Nystagmus developing in later life may be regarded as *perverted central fixation.*

Coal-miners' Nystagmus.

In the case of the coal-miner at work there is a combination of conditions tending to throw out of gear the mechanism of central fixation, and it is hardly to be wondered at that, sooner or later, a large proportion of miners develop nystagmus.

A very important factor in the ætiology of miners' nystagmus is undoubtedly the constant strain to which certain groups of ocular muscles, generally the elevators, are subjected as a result of the cramped position the men assume when underground. In support of this, there is the well-known fact that, in nearly every case of miners' nystagmus, the patient can, by so directing his gaze as to bring these muscles into a position of rest or of strain, stop or start the oscillations at will. Further, the surgeon can produce the same result by resting or fatiguing the patient's muscles (elevators) with the aid of prisms, base up or base down, as the case may be.

Secondly, no one can doubt that defective illumination of the coal mine plays an important part in the ætiology of nystagmus. At best, the visual stimuli are very weak, and in view of the fact that the fovea is less sensitive to minimal stimuli of white light than the rest of the macula, it is more than probable that the miner departs from central fixation in order to bring his images on the peri-foveal zone. This procedure, carried out day after day, tends to disorder the delicate mechanism of central fixation.

In a doubtful case of miners' nystagmus, if one is unable at first to elicit the oscillations, it is often possible to do so after the patient has been in the dark room long enough to allow of complete dark adaptation of the retina. Frequently, however, in mild cases, a combination of muscle strain and defective illumination must be employed in order to elicit the symptoms.

Of the other conditions in connection with a miner's work that have been blamed from time to time for causing nystagmus, one might mention the prescence of gas (methane) in the pit. It is just possible that, by poisoning the cerebral centres and tracts, this gas would assist in unbalancing the delicate co-ordination necessary for central fixation.

The Personal Factor.

In addition to the factors already mentioned, there must obviously be a personal one ; otherwise, all coal miners would suffer from nystagmus. In some few cases one is unable to discover this factor and must assume that there is a special idiosyncrasy—possibly an imperfectly developed fixation faculty—but in the majority of cases the personal factor is a *visual defect* which, taken in conjunction with the conditions under which the miner works, is sufficient to interfere with the function of central fixation. In my experience, a miner suffering from corneal opacities, choroiditis, simple glaucoma, toxic amblyopia, or refractive error is particularly prone to develop nystagmus and of these conditions a refractive error is by far the most important. In fact, in a series of 300 consecutive cases of miners' nystagmus, I found refractive errors in 90 per cent.

It is interesting to note that many patients suffering from miners' nystagmus are deficient in the power of superduction, but whether this should be regarded as a causal factor or simply as a result of the strain to which the elevating muscles of all miners are subjected I am unable to say.

Prognosis.

The ultimate prognosis of miners' nystagmus is distinctly good. It never leads to ocular disease or to blindness, and as soon as the patient is removed from the influence of certain causal factors, it tends to disappear without further treatment.

A large proportion of miners suffer from nystagmus without being aware of the fact—that is to say, the malady tends to become chronic and in that stage gives rise to no troublesome subjective symptoms. On questioning these patients, one finds that they have gone through a period of more or less discomfort, but have persevered with their work and have ultimately reached a stage at which the condition ceases to make any impression on their consciousness. Most of these cases are in old miners who arrived at this happy state of affairs before the days of the Compensation Act. The modern miner is, generally speaking, too well educated in the signs and symptoms of the affection and too well aware of his rights under the Act to persevere voluntarily until the chronic stage is reached.

An outstanding feature of miners' nystagmus is, of course, its tendency to relapse after an apparent cure has been obtained. For this reason I usually advise a man to continue working as long as possible in the hope that he will arrive at the chronic stage, and I am convinced that, in the majority of cases this can be done without any great hardship if the man makes up his mind to it from the beginning.

If, however, a man presents himself with well-marked symptoms, and insists that he is unable to work, one has no alternative but to sign him up for compensation. Then the question arises as to how long he is likely to be off work, and it is never an easy one to answer. Once the man has been put on compensation it is not usual to allow him to return to work until all signs of nystagmus have disappeared, and in estimating how long this is likely to take one may be guided by two considerations: (1) the severity of the attack; (2) the completeness with which the causal factors can be removed.

The severity of a given case, generally speaking, is in inverse ratio to the angle through which the patient must elevate his eyes above the horizontal in order to bring on the oscillations. This angle can be measured by means of the vertical column of a Maddox tangent scale or by a special instrument which I have had made for the purpose. With this instrument I measure the angle from time to time and it is very instructive to watch it increase as the weeks go by, until, finally, no oscillations can be elicited even at the extreme point of elevation. In a moderately severe case nystagmus is brought out at a point about 5° above the horizontal; in very severe cases the oscillations do not cease even at the horizontal position, and the gaze requires to be directed to a point 5° or 10°, or even more, below the horizontal before the nystagmus disappears.

With regard to the removal of the causal factors, if the patient refrain from working in the pit, he will remove two important factors, but his recovery will be greatly hastened if attention be paid to the personal factor as well. If, however, the personal factor cannot be eliminated or improved by the prescription of suitable glasses or treatment, the prognosis is much less satisfactory.

A patient who has recovered from an attack of nystagmus and returns to work under the old conditions is practically certain to relapse sooner or later. For this reason all such men should, if possible, be given work under better conditions, *e.g.*, in a thicker seam, where there would be less muscle strain, or in a better lighted pit. At the same time the men should be under constant supervision with regard to their visual defects.

Many cases gradually relapse into the chronic form without further trouble. Others have a second, or even a third, acute attack before reaching the chronic stage, each attack, as a rule, giving rise to less inconvenience than the previous one and bringing the patient appreciably nearer the chronic stage.

How soon should a man return to work after an acute attack? To a certain extent each case must be taken on its merits, but I find the following rule quite satisfactory in dealing with a considerable number of cases.—If, after the patient has been in a dark room for 30 minutes, no oscillations can be elicited when the eyes are brought to the extreme point of elevation and kept there for 30 seconds, the man may be allowed to return to work in one month.

An interesting point arises in connection with the personal factor and the question of compensation. When the predominant ætiological factor is advanced ocular disease, *e.g.*, high myopia, choroiditis, or chronic glaucoma, it is doubtful whether the patient is really entitled to compensation. It would be instructive to see such a case decided in the County Court.

REVIEW.

SOME OF THE RARER INDUSTRIAL DISEASES AND INJURIES OF THE EYE.*

BY

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As a modest and entirely unoriginal addition to the "Discussion on Industrial Diseases," I venture to submit the following remarks dealing with some of the common occupational maladies and injuries of the eye.

By far the more important agents capable of producing amblyopia or amaurosis do so by their action upon the optic nerve or the ganglion cells of the retina. As examples of this group may be mentioned methyl alcohol, dinitrobenzol, dynamite, carbon bisulphide, lead, and copper. Irritation of the conjunctiva may be produced by beta-naphthol and African boxwood (*Gonioma Kamassi*); and staining by chrome, anilines, and silver. Injuries to the cornea may be brought about by the local action of bichromates, anilines, dimethyl sulphate, and bituminous dust. Infection, local and general, may be induced by inoculation with the bacillus of anthrax. Phosphorus has been known to affect the eyeball. Lastly, we shall glance at certain injuries to the eye.

Methyl Alcohol.

Little has been heard in England of the injurious effects upon the system in general and the eyes in particular of methyl alcohol, otherwise called "wood spirit" or "wood naphtha." From the farther side of the Atlantic, however, many such reports are to hand, and it was estimated by Casey A. Wood[1] that up to the year 1905 at least 158 cases of blindness and 156 deaths had resulted from methyl alcohol intoxication. This form of toxæmia is by no means unknown in Russia, France, and Germany.

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* A contribution to the "Discussion on Industrial Diseases and Accidents" at the Oxford Ophthalmological Congress on July 16th, 1915.

The poison is usually taken by the mouth as methyl alcohol, pure and simple, methylated whisky, or under the guise of various compounds containing that agent, such as Columbian spirits, bay rum, essence of Jamaica ginger, Florida water, Cologne spirits, Kuntzen's balsam, and a variety of other liquids.

But a number of cases are on record where the methyl alcohol was introduced into the system by the lungs or the skin, and to that extent the harmful effects of this agent may be regarded as industrial accidents. For example, Casey A. Wood and the late Frank Buller,[2] writing in the year 1904, published nine such cases, of which six had followed mixing or working with shellac dissolved in methyl alcohol or Columbian spirit, which contains about 95 per cent. of methyl alcohol. In Schrapringer's case the patient inhaled the poisonous fumes while engaged in coating with shellac varnish the inside of beer vats, and similar accidents have gone on record by Stricker,[3] Carhart,[4] de Schweinitz,[5] and Tyson.[6] In H. Gifford's case[7] decrease in sight, difficulty in walking, and death occurred in a photographer who spent some time every day in cleaning glass plates with methyl alcohol in a small and poorly ventilated room. In another of Gifford's cases blindness followed two hours after a jack-of-all-trades had painted and varnished a small room (16 feet by 14 feet by 8 feet), using wood alcohol in the process. The windows and door of the room were closed extra tight, in order to keep out dust.

H. H. Tyson[6] has described a couple of cases in young women, engaged in polishing lead pencils with varnish made from wood alcohol. Twenty-five to thirty young women worked in the same room where his other patients were employed, and all of them suffered from headaches, and many of them had been treated for gastric catarrh. In hat and whip factories, where the employees are constantly exposed to the fumes of wood spirit, we learn from Casey A. Wood[1] that symptoms of general intoxication are not unknown, especially among the "green hands." In a case by W. H. Wilder,[8] the patient was blinded by drinking some methyl alcohol used in his trade as a decorator for drying colours on china. F. A. Phillips[9] has reported a case of blindness following exposure to the fumes of spilled methyl alcohol in a man, 53 years of age, whose duty it was to distribute the paint, oil, and alcohol used in a paint factory.

The burning of methyl alcohol, as, for example, in a lamp for heating purposes, is not devoid of danger (H. Gifford), and even the liberal use of formaldehyde as a disinfectant has been known to produce symptoms of poisoning.

The part played by idiosyncrasy in methyl alcohol intoxication is brought out by Wood and Buller[2] in the following striking way :—" If ten persons drink, say, four ounces of Columbian spirits within three hours, all will have marked abdominal distress and four will die, two of them becoming blind before death. Six will eventually recover, of whom two will be permanently blind."

It has been proved by Tyson and Schoenberg[10] that in guinea-pigs, dogs, rabbits, and a monkey, death can be brought about by the inhalation of methyl alcohol alone.

In this form of amblyopia, symptoms, as a rule, supervene quickly, and the patient is often found to be blind on recovery from an alcoholic debauch. According to de Schweinitz,[5] however, when the poison has entered the system by the lungs, several months may elapse before the blindness ensues ; or in other words, its action is cumulative. The amaurosis involves both eyes.

Its prognosis is bad, since after improvement for a few days, it ends by relapsing once more, this time into permanent blindness. The visual fields are nearly always contracted, and an absolute central scotoma is rarely absent. The widely dilated pupils are irresponsive to light. Neuro-retinitis is quickly succeeded by optic atrophy, with contracted retinal vessels.

It has been shown by Ward A. Holden,[11] and confirmed by Birch-Hirschfeld,[12] that the primary effect of the poison is on the ganglion cells of the retina, causing a grave loss of function. This is followed by local degenerative processes, and eventually by atrophy of the optic nerve.

In bringing this section to an end I may, perhaps, quote the conclusion reached by Wood and Buller[2] as to diagnosis.—" When dilated pupils and blindness (total or partial, temporary or permanent) accompanies, or follows shortly after, an alcoholic debauch, the presumption is that the intoxication is due to wood alcohol."

Dinitrobenzol.

Nitro- or dinitrobenzol, as everybody is aware, has been largely used in the making of high explosives, as " Roburite " and " Sicherheit " for use in war, the mining industry, and so forth.

Exposure to the fumes of these products may give rise to anæmia, cyanosis of the lips and finger tips, numbness of the extremities, unsteadiness of the gait, alterations in the colour of the urine, and to other symptoms of a general intoxication.

In 1881, M. Litten[13] described retinal changes in connection with poisoning with nitrobenzol. There was marked cyanosis retinæ. All distinctions between retinal arteries and veins were obliterated as regards colour, and both sets of vessels appeared to be filled with ink. Small hæmorrhages were present. No amblyopia. But we have to thank A. Nieden[14] for having pointed out, some years after Litten wrote, that dinitrobenzol might exert a deleterious effect upon the eyes of workmen. In less than one year 25 out of 33 workmen employed at a " Roburite " manufactory at Witten, near Bochum, were more or less dangerously poisoned by the fumes of dinitrobenzol. In one patient, a man of 26 years, the eyes became affected two weeks after the appearance of a general intoxication, as shown by dyspnœa, anorexia, palpitation, tachycardia, nausea, giddiness, and a bad taste in the mouth. Sight was reduced to 10/200. The visual fields were much contracted (25° by 31° by 35° by 20°). There was pronounced venous hyperæmia of the retina, and in one eye an exudation was present on a retinal vein near the optic disc. The vessels of the ocular conjunctiva were dilated and cyanosed. Sight was slowly regained after four weeks, and the ophthalmoscopic and other changes eventually disappeared.

A few years after Nieden wrote, Litten[14] reported a case of amblyopia, and R. Prosser White[15] published six cases, and soon after that the late Simeon Snell,[16] in the course of an elaborate communication, added five more to the growing list, paying special attention to the changes in the fields of vision.

The amblyopia affected both eyes. Symptoms included failure of sight, contraction of the visual fields, with or without a central colour scotoma, some blurring or pallor of the optic discs, and enlargement of the retinal vessels, particularly of the veins. The intoxication might occur by exposure to dust or to steam charged with particles of dinitrobenzol during the trade processes of "grinding" or " mixing," especially in the last-named occupation. Snell made the important observation that cyanosis of the retinal vessels might be found even in workmen who had made no complaint of their sight.

But few accounts have been published during the last decade of this particular form of amblyopia. In point of fact, the only one I can quote is to be found in the *Annual Report of the Chief Inspector of Factories and Workshops* for the year 1913, where R. Prosser White (one of the earlier observers) is stated to have reported two such cases from an explosives works.

This must be largely due to the precautions adopted, but the further important fact must not be lost sight of, namely, that dinitrobenzol has been to some extent replaced by other substances in the making of modern high explosives. Thus, picric acid is now the basis of " Lyddite," " Melinite," and "Shimose," while the famous " T.N.T.", so much used in the German army and navy, is simply trinitrotoluol, a coal-tar product, which is manufactured from toluene or toluol by the action of strong nitric acid (" nitration "), and which belongs to the same group of hydrocarbons as benzene. It may be added that " Ammonal ", the favourite high explosive in the Austrian army, is a mixture of picric acid, " T.N.T.", aluminium, and ammonium nitrate.

There can be little doubt that before long symptoms, local and general, analogous to those already described in the case of dinitrobenzol, will be found to follow the industrial employment of these modern substances. " T.N.T. " is already known to cause dermatitis amongst the workers.

Dynamite.

A curious case has been placed on record by L. D. Brose,[17] where a farmer went into a well that had run dry, and inserted a stick of dynamite in a hole that he had drilled into the sandstone rock ; this failing to explode, a second hole was drilled, charged with blasting powder, and both charges were then exploded. Two and a half hours afterwards, the farmer re-entered the well, leaving a couple of men on the surface to render any help that might be required. Hearing nothing from the well, one of the men descended, and found the farmer unconscious in a sitting posture. He called for help, and the body of the farmer was got out. At this juncture, while attempting to leave by a ladder, the rescuer himself lost consciousness, and fell to the bottom of the well. Both the patients where found to be blind when they regained consciousness. The farmer's pupils were semi-dilated, although they reacted to light. V.=perception of light. The optic discs were pale, the retinal arteries small, and the veins distended. Eighty-three days after exposure to the poisonous fumes, the sight was equal only to counting the fingers held just in front of either eye. The other man, whose exposure had been brief, recovered normal sight.

Brose's is not the only case on record. For example, G. H. Hogg[18] met with amblyopia, with congested optic discs and cyanosis of the retinal arteries and veins, in a patient who had been much exposed to the fumes of " gelignite," a blasting powder of which nitro-glycerine is the chief component. F. Vinsonhaler[19] had a patient who was blinded, with appearances of congestion of the optic disc, after exposure to the fumes of dynamite.

Tobacco.

There is a difference of opinion as to whether tobacco can give rise to toxic symptoms in those who have to work with it. Galezowski[20] stated that visual disturbances might occur under those circumstances. C. H. B. Shears[21] found no instance of failure of sight in a large Liverpool tobacco factory, where 1,200 men and women were employed. Charles Lee[21] found no case of loss of sight in a large tobacco factory at Chester. Dowling[22] investigated the point in the Cincinnati tobacco factories, where 3,000 men and women are employed, of whom Dowling examined the eyes of 150. His results, on the whole, confirmed those obtained by Shears in Liverpool. Simeon Snell's investigation[23] into the Sheffield snuff and tobacco factories yielded a negative result.

On the other hand, G. E. de Schweinitz[24] mentioned the case of a girl, a non-smoker and a non-drinker, whose work in a tobacco manufactory necessitated her arms being immersed in tobacco juice. She became affected with typical tobacco amaurosis, but made a good recovery on giving up the work.

Parisotti[66] had a somewhat doubtful case in a woman of 31, who had worked in a cigar factory for sixteen years.

Carbon bisulphide.

Carbon bisulphide finds many uses in the industrial world. It was formerly employed upon a large scale in vulcanising or "curing" rubber—that is to say, in rendering rubber permanently elastic by combining it with sulphur. The bisulphide was employed to dissolve and to carry the vulcanising agent, chloride of sulphur, into the rubber, the so-called "Parkes" or "cold process." Nowadays, the sulphur is mixed with the rubber, and the vulcanising is effected by subjecting the article to a high temperature. The bisulphide is also used in the preparation of a certain kind of motor tyre, but no serious illness has been found among the workers, probably because the amount required in the process is small as compared with that needed in the vulcanising of rubber.[25] Carbon bisulphide has other important industrial uses which need scarcely be gone into here.

It has been known for some considerable time that the fumes of carbon bisulphide may, in addition to symptoms of general poisoning, give rise to a toxic amblyopia, quite analogous to tobacco or alcohol blindness. A knowledge of the fact is widely disseminated among eye surgeons, largely owing to the report[26] of a committee appointed by the Ophthalmological Society to investigate the condition. That committee collected and tabulated twenty-four cases of carbon amblyopia, which they found never occurred as an isolated symptom, but was always associated with well-marked general toxic symptoms. The prognosis was fair, not to say good, provided the sufferer could give up entirely the "curing" work. The poison entered the system through the lungs, and the committee found that if suitable means were taken to prevent breathing of the vapour, amblyopia did not occur.

In forty-eight cases collected by G. E. de Schweinitz,[65] of Philadelphia, all worked in rubber factories. The ages of the patients ranged from fifteen to sixty-six years. Only five cases occurred in women. de Schweinitz found that amblyopia was present in about 40 per cent. of the patients with chronic carbon bisulphide toxæmia. In a rubber works employing about two hundred "hands," Simeon Snell[27] found one who had suffered from the characteristic amblyopia. v. Krüdener[28] has reported an instance of atrophy of the optic discs from inhalation of carbon bisulphide in a workman in a chemical manufactory.

Copper.

The case of occupational amblyopia, placed on record by Jean Galezowski,[29] must surely be unique.—The patient was a man of 57 years, who had played a brass instrument at a ball nightly from 9 p.m. to 3 or 4 a.m. since he was twelve years of age. There was a history of severe colic. The palms of the hands were impregnated with a greenish-black substance of metallic appearance. The sight of the right eye was reduced to 1/10. The left eye showed an absolute central scotoma for white and for colours (10° by 10° by 10° by 15°). The optic discs were pale as regards their outer side. It was thought that the patient had absorbed copper through his lips and hands, which were always in contact with his worn musical instrument.

The fact may be mentioned incidentally that a case of neuritis from copper has been reported by Auerbach.[30]

Irritant Woods.

It is well known that certain kinds of wood may irritate the skin of those who have to work with them. Such are East Indian satinwood, teak, Borneo rosewood, and West Indian boxwood. Some folk are extremely susceptible to these irritants. Teak has been known to produce swollen eyelids in patients who also showed irritation of the skin. According to the *Report of the Chief Inspector of Factories and Workshops* for the year 1907, certain consignments of Borneo rosewood produced in workers an irritation and soreness of the eyes, while East Indian boxwood had to be discarded in the shuttle-making trade owing to its irritant action on the eyes. West Indian boxwood, too, which has been used in shuttle making, is another of these noxious woods.[31] The processes involved in working with the wood may give rise to difficulty in breathing, nausea, faintness, and running of the eyes and nose, often with headache. It was found that the symptoms came on two to four hours after beginning to work with the boxwood, and continued for two or three days after leaving it. The affection of the eyes was limited to "running," and no ulcerative condition was set up, although in a few instances the mucous membrane inside the nares was observed to be swollen.

The Chromes.

The bichromates have many uses in the industrial world, as in dyeing, tanning, cotton and calico printing, the manufacture of glass, and the making of certain brands of Swedish matches, to mention but a few of the more important.

I have sought in vain to ascertain whether the eye shows any affection analogous to the chronic ulcerations of the skin (the so-called "chrome holes") or the perforation of the *septum nasi*, so common in workers in bichromate manufactories. It has been claimed, indeed, by F. Hermann[32] that in the absence of precautionary regulations, all workers in chromium and chromates suffer in those ways sooner or later. T. M. Legge[33] examined 237 workers and found ulcers in 107 and perforations in 87, and considered the conditions as due to the dust to which the workers were exposed, more especially when breaking and packing the fine crystals.

On the other hand, a case of vesication of the cornea produced by chrome liquor has been published by Ernest Thomson.[34] Three days before the patient, a chemical works labourer, was seen, he had received a drop of the liquor in one eye.* The lower half of the corneal surface of the injured eye bulged forward in the form of an almost transparent bag, due to vesication. The vision was much reduced. There was corneal anæsthesia. Some thirty-seven days after the accident, sight was barely 6/36 and the cornea was still anæsthetic. Finally, an instance of discolouration of the cornea by chrome has been reported by C. Koll.[35]

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* The patient was not clear upon this point and suggested that a crystal of potassium bichromate and not a drop of the liquor had entered his eye.

The Anilines.

That certain of the aniline colours may give rise to more or less serious inflammation of the mucous membrane of the eye, is abundantly shown by the somewhat numerous cases where bits of aniline or copying or indelible pencil getting into the conjunctival sac, have set up pigmentation or inflammation of the conjunctiva, cornea, or sclera. Loss of the eye, indeed, has even been induced by those means, as witness three cases by Y. Kuwahara[36] and a couple by J. Dunn.[37]

Experiments upon rabbits by A. Gräflin[38] showed that panophthalmitis could be brought about by dusting crystal violet, Victoria blue, or malachite green into the conjunctival sac of those animals. Inflammation of the conjunctiva or cornea followed the application of methylene blue, saffranin, auramin, prune, rhodamin B, and rhodamin 6 G. On the other hand, negative results followed experiments with direct blue and black, tartrazin, Congo, eosin, and water blue.

Y. Kuwahara,[36] experimenting upon the eyes of rabbits, found that pulverised copying pencil, similar to that which had caused loss of his patient's eyes, produced gangrene of the lids, membranous conjunctivitis, ulcerous keratitis, cataract, and in some instances panophthalmitis. The result was never negative. The copying pencils consisted of kaolin, graphite, and methyl violet. The two former substances had no effect upon the eye, but powdered methyl violet acted similarly to pulverised copying pencil. Similar results followed the employment of pyoktanin, gentian violet, and eosin.

Alfred Vogt,[39] of Basle, conducted an elaborate experimental investigation upon the subject, using rabbits for the purpose. He found that the insoluble anilines caused little if any inflammation of the conjunctiva or other structures of the eye, a remark which applies also to the acid, neuter, and mordant colours. The basic dyes, on the contrary, might lead to panophthalmitis. Their virulence depended, in fact, upon two points: first, the intensity of their basic nature; and, secondly, their solubility in the fluids of the eye. It may be noted here as a practical point that even the most virulent basic aniline was rendered powerless for harm if within three to five minutes of the introduction of the dye into the rabbit's eye, the conjunctival sac was washed out with a 5 per cent. to 10 per cent. solution of tannin. Vogt claimed that if plain water or solutions of sodium chloride, boric acid, or sodium bicarbonate were employed more harm would be done than if the eye were not touched at all. The action of the tannin was to convert the basic colours into insoluble and inert compounds.

During 12 years (1890-1902 inclusive) 77 workmen in aniline colours attended the Basle Eye Clinic, and of this number Gräflin[38] found that 36 were affected with keratitis and 41 with conjunctivitis. On enquiry, it was learned that they had worked with crystal violet, Victoria blue, and malachite green, or with colours closely related to them. Vogt[39] examined seven cases of keratitis and ten of conjunctivitis among workmen. Most of the cases were due to Victoria blue (29·41 per cent.) and a smaller number (11·76 per cent.) to methylene blue. The other basic colours included in the list accounted for single cases only. A case has been reported by A. Senn where opacity of the cornea was induced by an aniline colour.

In a case by the late J. G. Mackinlay[40] a man employed at an aniline dye works developed a dark-brown staining of the exposed parts of the conjunctiva and cornea, and a defect in sight. The hair and the exposed parts of the skin were also stained. For seven years he had worked for 10½ hours a day in one colour alone, namely, brown, which occurred as a flour-like powder. The cause of the defective vision is not apparent from the report, and it was probably merely coincidental.

Clarence A. Veasey[41] has narrated the case of a man, aged 53 years, who developed a central amblyopia from inhalation of aniline fumes. He was employed in a dye works to weigh and to dispense different ingredients from which the dyes were made, and worked in a small and badly-ventilated room for two hours every day. Several chemicals were employed, such as chloride of ammonium, carbonate of sodium, sulphate of copper, sulphate of iron, bichromate of potassium, chlorate of potassium, and the aniline salts. It was thought by Veasey that the anilines were responsible for the eye trouble, entering mainly through the respiratory system and to a less extent through the skin. Partial recovery took place. It should be added that the patient also suffered from ulceration of the mucous membrane of the mouth and nose, apparently produced by the action of potassium bichromate.

Instances of intoxication by aniline oil seem to be rare. Such a case was, however, reported by Bocci[42] in a man who developed a defect in sight after having spent a morning in decanting aniline oil. Vision was reduced to one-half normal. There was considerable limitation of the visual fields, and complete dyschromatopsia. Optic papillitis was also present. Cure was complete in three weeks, despite some residual pallor of the optic discs.

Silver.

Every ophthalmic surgeon is aware that the long-continued employment of preparations of silver to the eyes is prone to give rise to the peculiar and characteristic staining of the conjunctiva or cornea generally known as "Argyrosis." It is not so widely recognised, however, that an analagous condition may be met with as an occupational affection. In a man who had been engaged for twenty-nine years in polishing silver with iron oxide (*englisch Rot*, rouge), Hirschberg[43] found a bluish dark-grey discolouration of the ocular conjunctiva below the cornea. The condition was evidently due to fine particles of silver, and was more pronounced in the left eye, the one chiefly exposed to the dust of the polishing wheel. The workman's face was of a grey-violet hue, and his hair, once a dark-blond, had become yellowish-red. Edgar Chatterton[44] observed argyrosis of the conjunctiva in a woman, 38 years of age, who had worked with fulminate of silver in the making of toy crackers all her life. At the inner canthus of each eye there was a dark-grey discolouration, which involved the plica, the caruncle, and the innermost extremity of the lower palpebral conjunctiva.

Dimethyl sulphate.

In 1908, P. Erdmann,[45] of Heidelberg, published an account of the experiments he had undertaken to determine the effects of the fumes of dimethyl sulphate on the eyes of rabbits and guinea-pigs. He found that they produced inflammatory symptoms, especially as regards the cornea. These culminated in shrivelling and detachment of the epithelium and haziness of the cornea.

Cases of injury to the human eye by this substance may be found in the literature. For example, P. Erdmann[46] found that men exposed to the fumes of that agent noted little inconvenience at the moment, but that after the lapse of some hours, developed pain, while the superficial layers of the cornea became cloudy. Recovery took place. A similar condition followed a splash of dimethyl sulphate into the eye. Again, in a case described by P. H. Adams and Bernard Cridland[47] four hours after exposure to the fumes, the patient's eyes began to water and soon afterwards became painful, and his nose was "stopped up" and watering. On the next day the patient found that he had lost the senses of taste and smell. His temperature remained at 100° F. for a couple of days after exposure to the fumes. There was inflammation of the conjunctiva, together with some fine dots deep in the exposed part of the cornea. Subsequently, there was a slight contraction of the fields of vision, with possibly partial pallor of one optic disc. When seen three months after the injury, recovery seemed to be perfect.

Bituminous Dust.

In a couple of labourers engaged in discharging blocks of bitumen from the hold of a boat Truc and Fleig[48] found a curious and characteristic form of disease. There was irido-keratitis, coinciding in position with the palpebral aperture, leading to ulceration of the cornea, and in one of the patients to pus in the anterior chamber. A special susceptibility was suggested by the fact that symptoms appeared within a few days of the exposure, whereas in the ordinary way labourers did not develop inflamed eyes when exposed for long to a similar bituminous atmosphere. The authors[49] conducted experiments by sprinkling English and American tar into the eyes of rabbits and dogs, which were then found to develop blepharo-conjunctivitis, interstitial keratitis, with persistent leucomata, ulcerous keratitis, episcleritis, and iritis. In the dog the anatomical position of the corneal lesions exactly reproduced that of the corresponding lesions observed in man. Bituminous vapours produced slight inflammation of the conjunctiva and some infiltration of the cornea in the eyes of rabbits.

In some previous experiments Truc and Fleig[50] showed that the dust of tarred roads excited a much more harmful action upon the eyes than the dust upon roads not treated in that way. The damage was in direct proportion to the amount of tar contained by the roads.

Anthrax.

Whatever may have been the case once, anthrax as it affects the eye has now become a rare disease in England. In fact, during the last decade I have been able to find only cases by William Mitchell,[51] Randall Herley,[52] and S. McMurray.[53] A remarkable case has been published by Manolescu[54] where double optic atrophy followed malignant pustule on the upper eyelid. Under local applications and anthrax serum, the skin lesions subsided, but as soon as the lids could be opened, the woman was found to be blind. There was exophthalmos, chemosis, retinal œdema, and venous hæmorrhages, and, later on, there was complete optic atrophy, the veins remaining of normal size but the arteries being reduced to threads.

Phosphorus.

That well-known industrial poison, phosphorus, has been known to affect the eye in an indirect way. For example, J. A. Spalding[55] had such a case in a woman who had worked for some months in a match factory in Portland, Maine (U.S.A.). The mischief began with necrosis of the alveolar process of the superior maxilla, and then the patient developed marked proptosis of the left eyeball, which "projected so far in front of the other as that its posterior aspect was on a level with the cornea of the right eye." The sight was totally lost. The eyeball could not be voluntarily moved in any direction. The cornea was in a state of incipient necrosis. The globe was enucleated, and its removal was followed by the escape from the orbit of a quantity of offensive pus. Probes or spoons could be readily passed into the antrum through the necrotic floor of the orbit. About two months after the enucleation, it was found necessary to remove the upper jaw. For a time all went well, but later the patient was attacked with facial paralysis, followed by hemiplegia and aphasia, and at length by death from exhaustion and paralysis. The sequence of events in this case had been necrosis of the superior maxilla, followed by disease of the antrum, together with extension into the orbit.

Caisson Disease.

It appears that the eyes may suffer in caisson disease. Such a case was brought forward by George C. Harlan[56] in a man, aged twenty-nine years, employed in the construction of a bridge across the Delaware. The man had worked in a caisson under an atmospheric pressure of from eighteen to thirty pounds, eight hours a day until sixty feet below the surface, and then for six hours a day. Giddiness, debility, anorexia, nausea, and vomiting were followed by occasional numbness of the right side, and somewhat later, by pain and irritability of the right eye. There was anæsthesia (almost complete) of the cornea and conjunctiva and of all parts of the face supplied by the ophthalmic and superior maxillary branches of the fifth nerve, and the cornea was steamy, with an ulcer, 3 mm. in diameter, near the outer border. At a later stage, a small hypopyon was present. The ulcer slowly healed, but sensation was not regained.

Some Curious Injuries to the Eye.

In conclusion, I may be permitted to refer to two or three somewhat peculiar kinds of injury to the eye.

1. In the first, cases of which have been described by Pach,[57] the injury is liable to occur in the manufacture of incandescent electric lamps. The lamps, it appears, are connected in series with the current, the voltage of which is increased from time to time. A workman may cause a short circuit while removing a defective lamp, and when this occurs, he is literally exposed to bombardment with minute particles of molten copper, from which his eyes may be seriously injured.

2. For a description of the second form we are indebted to R. H. Elliot.[58] That gentleman tells us that although it is illegal in southern India to prepare explosives in private houses, yet it is done on a large scale in preparation for certain native feasts, where it is customary to explode many "crackers." In order to make the detonating powder, red sulphide of arsenic (realgar) and potassium chlorate are mixed with coarse gravel, and the whole is tied up in paper and wrapped in cloth. This "cracker," when thrown on the ground or against a wall, explodes with great noise and violence. Accidents, if not exactly common, do occur in the licensed factories, but it is the amateur makers who suffer more frequently. There is no danger until the gravel is mixed with the other ingredients. During that part of the process, the maker stoops over the mixture, and that is how it comes about that the eyes suffer so often. The appearance of an eye injured in this way is characteristic. The skin of the face and the anterior parts of the eye, including the conjunctiva and cornea, and sometimes the lens and iris, are studded, as it were, with fine grains of red pepper, the realgar employed in compounding the explosive. A kind of chemical irido-cyclitis, not infrequently culminating in loss of the eye, is apt to supervene at a later period.

3. Edwin G. Rust[59] has related the case of a lady who was struck in the eye "by a spark from a trolley wire," and he removed a brownish-black body,

1 mm. in diameter, from the cornea. When submitted to an expert, this particle was declared to be of oxide of copper. Rust speaks of having treated twenty-six other patients similarly affected.

It seems that there is always some combustion as the trolley pole in the over-head system runs over the plates of which the hangers and switches are made. In the case of poor or interrupted contact, the copper is detached, at once oxidized, and thrown off in brilliant sparks. The substance of the sparks is always oxide of copper unless in the case of mechanical abrasion of the wire when the spark substance consists either of pure copper from the wire, or of a "poor grade of bronze from the trolley wheel."

4. It would appear from the observations of S. Mitchell,[60] of Hornellsville, U.S.A., that injuries to the eye from explosion of the water gauge attached to the boiler of most locomotives and stationary engines, is rather a common occurrence. The stoker or the man in charge of the engine is often the recipient of injury to the eyes from the flying fragments of glass. These accidents, as Mitchell remarks, will doubtless become less frequent in the future, since the glass is now encased in a metal tube provided with an opening and the use of a mirror, placed back of the gauge, reflects the opening and allows the man in charge to see at a glance the movement of the fluid in the gauge. A few years later we find C. D. Conkey,[61] however, reporting three accidents of the kind, to say nothing of a fourth due to the explosion of the oil gauge in the engine. He tells us that one of the large trans-continental lines has made no effort to shield its gauges with wire netting, and even at the time of writing many of the engines go unprovided with this simple equipment. Of 297 eye injuries in railroad employés, W. Johnson[62] found that nineteen belonged to this class.*

5. Percy T. Adams,[63] when attached to the Kent County Ophthalmic Hospital at Maidstone, found that during the latter end of August, and throughout the whole of September, cases of an acute form of ophthalmia occurred among the hop operatives. It was mostly prevalent when the catkins were mature, and did not seem to be contagious. The principal signs were those of a mechanical irritant. It appears that the hop bracts, leaves, and bines are set with sharp-pointed hairy processes, and the inflammation is caused by these spines becoming impacted in the conjunctiva or the cornea, carried either by currents of air, or by the hands of the hop pickers.

6. The last injury to be mentioned, "Oyster Shuckers' Keratitis," was brought prominently under the notice of the profession some twenty years ago by Robert L. Randolph,[64] of Baltimore, where the affection appears to be relatively common amongst those engaged in the industry of opening oyster shells. It is more frequent in Maryland than in any other part of the States, and of the towns Randolph tells us that Baltimore "seems to carry off the palm." At least six thousand "shuckers" are to be found in Maryland, and most of them work in the shucking-houses of Baltimore. Indeed, the industry is said to be more extensive in that State than anywhere else in the world. The frequency of the injury is due to the way in which the shell is opened.—A minute particle is violently chipped off with the hammer before the bivalve is prized open with the knife blade. It is this detached bit of shell that causes the injury to the cornea. In other parts of the States, as in the far south and down east, the hammer is dispensed with, and the "shucker" sticks in the point of the knife without preliminary in order to force open the shell. This explains why the disease is seldom met with in the portions

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* Simeon Snell met many cases of severe eye injury from the breaking of water gauges, both from flying glass and from scalding (v. Oliver's "Dangerous Trades," 1902, p. 787).

of the country just mentioned. The injury to the cornea is followed, within twenty-four hours of its infliction, with an area of infiltration, varying in size from a pin's head to one twice those dimensions. The more severe cases may be followed by permanent damage to the eye. Randolph's bacteriological investigation of sixty-five cases failed to reveal any specific organism, but the carbonate of lime (of which the oyster shell is almost entirely composed) is not the only chemical ingredient capable of exciting keratitis

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I.—THE OCULAR MOVEMENTS.

(1) **Lerperger, O.—Two cases of abnormal innervation of the eye muscles. (Zwei Fälle von abnormer innervation der Augenmuskel.** *Zeitschrift für Augenheilkunde*, June, 1913.

(2) **Eppenstein, Arthur.—Disturbances in the synergism of ocular movements. (Störungen in Synergismus von Augenbewegungen.** *Klin. Monatsbl. f. Augenheilkunde*, August, 1913.

(1) **Lerperger** reports two cases from Dimmer's clinic at Vienna in which the following phenomena were noted.—In the first case when an object was looked at from about one metre away to the extreme left, both eyes followed the object for a time and then suddenly the left eye was strongly adducted by a powerful contraction of the left internal rectus, both upper lids were elevated, and both pupils contracted. The patient now saw double, and complained of diplopia. The second case was somewhat similar. Close fixation caused strong contraction of the right internal rectus with resultant diplopia. The author is unable to explain these cases. T. HARRISON BUTLER.

(2) **Eppenstein,** of Marburg, reports the two following cases.—The first was in a woman, 32 years of age, who, along with fever, manifested symptoms pointing to a lesion in the neighbourhood of the superior orbital fissue and optic foramen, affecting the second, third, fourth, fifth, and sixth cranial nerves. In the course of two years, there was considerable recovery in the ocular movements, but anæsthesia of the cornea, slight ptosis, and certain anomalous movements remained At the present time, thirteen years after the commencement of her illness, the pupil of the affected eye is small and gives no reaction except the lid-closure reflex, and its response to mydriatics is defective ; the eye is slightly convergent ; the upper lid does not follow the eye in its downward movement ; and when the eyes are directed to the left, i.e., with innervation of the internal rectus of the right (affected) eye, the right upper lid is strongly retracted.

The second case was also in a woman, who, in consequence of syphilitic infection, developed cerebro-spinal disease, accompanied by ophthalmoplegia which involved all the ocular muscles except the ciliary. Five and a half years after the illness began, there is slight ptosis on the right side, and the lid only imperfectly follows downward movements of the eye. As in the first case, the upper lid is not elevated with impulses to elevation of the eye, but is strongly retracted when the right eye is turned inwards.

To explain the peculiar synergic action of the levator and internal rectus in these cases, the author adopts Bielchowski's theory of "false paths," namely, that after interruption of nerve paths, some of the central stumps may grow into the wrong peripheral paths. In these cases, for example, the regenerated fibres of the levator have assumed a false connection with those for the internal rectus. The possibility of such an occurrence is supported by facts adduced by other authors regarding anastomoses between nerves, or intimate association of nerve fibres with muscles to which they do not belong. A. J. BALLANTYNE.

II.—GLAUCOMA AND REDUCED INTRA-CRANIAL PRESSURE.

(1) **Gorbunow. G. A.—Glaucoma resulting from lowered intra-cranial pressure. (Glaukom als Folge herabgesetzten intrakraniellen Druckes.)** *Centralbl. f. prak. Augenheilkunde*, February, 1912.

(2) **Noiszewski, K.—Glaucoma and reduced intra-cranial pressure. (Glaukom und herabgesetzter intrakraniellen Druckes.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(1) The interesting communication of **Gorbunow** begins with a reference to some experimental work of Noiszewski, who, in dogs, produced glaucomatous excavation of the optic disc by artificially reducing the intra-cranial pressure. In this connection Gorbunow refers to the case of a woman, aged 38 years, who suffered from migraine attacks so severe as to induce an attempt at suicide. A provisional diagnosis of intra-cranial tumour was made, and to reduce the assumed intra-cranial pressure, a lumbar puncture was performed. The day after this, the pain became exceedingly intense, and she was then referred to Gorbunow for ophthalmoscopic examination. He found marked contraction of both visual fields, nasally up to 10°, excavation of both discs, very shallow anterior chambers, and slight increase of intra-ocular pressure. He immediately used eserine, which produced an extraordinary effect. The patient expressed it as "having risen from the dead"; and shortly after, Gorbunow performed an anterior sclerotomy on each eye, and the patient went home quite well. Shortly after, as the result of great trouble, she had a recurrence, which again yielded promptly to sclerotomies, and since then (one year) the patient has remained well, without any return of even the slightest headache.

Gorbunow takes advantage of this paper to describe the beneficial effect which can be obtained in glaucoma from the inhalation of amyl nitrite. He cites a case which was being treated with eserine, and when the effect of this drug was becoming insufficient, the patient got on quite well for a while by occasionally inhaling amyl nitrite. A. H. LEVY.

(2) **Noiszewski,** of Petrograd, draws attention to some facts and speculations which bear on the question of the relationship of intra-cranial pressure and glaucoma. He says that experiments both on the human subject and on animals show that the lamina cribrosa can be altered in its level by differences in the balance between intra-cranial and intra-ocular pressure. The author himself has found that reduction of intra-cranial pressure in dogs by trephining the skull causes the disc and lamina cribrosa

to sink backwards, and he claims to have observed symptoms suggestive of the prodromal stage of glaucoma to follow lumbar puncture in patients with normal intra-cranial pressure. In the latter connection he quotes a case reported by Gorbunow, in which acute glaucoma followed lumbar puncture. There is also to be remembered the familiar fact that optic nerve swelling associated with elevated intra-cranial pressure, subsides after trephining the skull. Summing up, the author believes that continued reduction of intra-cranial pressure favours the occurrance of glaucoma simplex, while a sudden reduction of intra-cranial pressure may be the exciting cause of acute glaucoma.

A. J. BALLANTYNE.

III.—CYSTICERCUS.

(1) **Hirschberg, J.—Removal of a cysticercus from the vitreous. Result 29 years later. (Ausziehung eines Blasenwurms aus dem Glaskörper. Erfolg nach 29 Jahren.)** *Centralbl. f. präk. Augenheilkunde*, July, 1914.

(2) **Menacho.—Entozoic cysts in the eye, its adnexæ, and the orbit. (Los quistes con entozorarios, en el ojo en sus anexos y en la orbita.)** *Archivos de Oftalmologia Hispano-Americanos*, Junio, 1915.

(3) **Marquez and Pittaluga.—A cysticercus of the human lens. (Sobre un cisticerco del cristalino umano.)** *Archivos de Oftalmologia Hispano-Americanos*, Julio, 1915.

(1) It is always interesting to see a patient many years after operating on him, and when a surgeon of **Hirschberg's** experience remains active well on into old age, he must have many such experiences. The one here recounted is that of a patient from whose vitreous Hirschberg removed a cysticercus 29 years previously, in 1885. The operation consisted in entering the globe at the equator, down and out by means of a broad keratome, and pushing this in about 10 mm. The cysticercus immediately presented, and was removed. No vitreous was lost, and the wound healed by first intention. Vision improved, and the field also became wider. This improvement was maintained 29 years later, and the vitreous opacities, which had been present, had practically disappeared.

The importance of the case resides not so much in the method of dealing with cysticercus—for this is now a very rare condition—but in the proof which it affords that operations on the vitreous are not necessarily followed by detachment of the retina. Many surgeons are tempted to allow foreign bodies to remain in the vitreous if they are causing no obvious irritation. This, in our opinion, is unsound, because inevitably will the vitreous "sink," and consequently the retina becomes detached and the eye lost. It is really much safer to make an incision into the vitreous and to remove the foreign body, and the case above-cited shows that this can be done safely, provided due care and circumspection be observed.

A. H. LEVY.

(2) In this paper **Menacho** gives an account of some cases of entozoic cysts which have come under his notice. Among them are three cases of cysticercus in the subconjunctival tissue. In the first the diagnosis was complete, as the contained fluid was examined, and found to contain hooklets. In the others the freedom of the cysts, and their mobility on the subjacent parts, made the diagnosis probable.

Of the second class—cysts of the intra-ocular region—Menacho gives details of a case in which a small cyst was observed, freely movable in the anterior chamber. There is, however, no proof that the cyst was entozoic. The man was not willing to undergo any treatment by means of operation for its removal.

The last example given by Menacho is one of cyst of the orbit.—The patient was a small boy, in whom there had been noted for eighteen months slight exophthalmos directed down and outwards ; in the upper and inner angle of the orbit, there was, deeply placed, a tumour having an uneven surface, and very resistant ; it was not lessened by compression of the carotid ; it gave no *bruit ;* the exophthalmos was not reduced by pressure. A provisional diagnosis of tumour, probably sarcoma, was made, and Menacho proceeded to operate. At the time of operation the tumour was found to be cystic. The walls were thick and very tense, and firmly adherent to the orbital walls and to the apex of the orbit. It was found impossible, owing to the copious hæmorrhage, to dissect the cyst out whole, and so it was removed in fragments. A few days after, severe neuro-paralytic keratitis came on, and the eye eventually recovered with a large leucoma. H. GRIMSDALE.

(3) **Marquez**, of Madrid, observed in a patient a small rounded body just under the capsule of the lens, projecting into the anterior chamber. From its appearance and behaviour he suspected this to be a cysticercus, and advised removal. After removal, it was examined by **Pittaluga**, professor of parasitology at Madrid, and the diagnosis confirmed.

H. GRIMSDALE.

IV.—ANGIOSCLEROSIS.

Jackson, Edward.—Retinal angiosclerosis and associated lesions. *Annals of Ophthalmology*, July, 1915.

Jackson, of Denver, contributes a thoughtful article on the subject of retinal angiosclerosis, the main object of which is to instil into our minds the importance of the early diagnosis of arterio-sclerotic changes by means of the ophthalmoscope. His line of reasoning is as follows.—Angiosclerosis is an important factor in bodily decay, but can be held in check by regimen and medication ; many of its sufferers come to the ophthalmologist for refractive or other complaints ; an early diagnosis can then be made, and the lives of the patients regulated. If this were widely done, it " would constitute one of great triumphs of preventive medicine ; " the more so as " this disease comes at a time when age predisposes men to listen to wisdom, and so to lengthen out their remaining years."

So much for the leading motive of the article ! Incidentally, the paper is full of interest. It begins with a review of the earlier work on the subject, in which Bull and Marcus Gunn obtain honourable mention. The earlier view that the changes in the retina, which we are now discussing, were due to gout, faded in the light of wider knowledge, but its place was taken by the theory that the causal factor was a nephritis. " It is more in accord with our present knowledge to see in the clinical picture of renal retinitis " (so-called) " evidences of two factors ; one clearly vascular, the other more obscure, but best designated as toxic." Retinal angiosclerosis may indeed exist without serious disease of the kidneys. The pathologic anatomy shows infiltration, followed by hyalin degeneration, beginning and most pronounced in the intima, but extending even to the adventitia; later other changes occur which may lead to thrombosis. In the veins the primary changes are usually found in the adventitia. The changes in the vessels explain the symptoms, for the narrowed arteries stint the retina of its nutrient blood. The dilatation and tortuosity of the arterial twigs should, Jackson thinks, "be classed as a symptom of retinal inflammation or late toxæmia." The familiar appearances where an artery crosses a vein are ascribed to (1) "an opacity of the arterial wall capable of concealing the vein, without its being dense enough to declare itself," and (2) "an altered refraction of the vessel wall;" the hyaline change in the vessel wall transforming the latter into a convex cylindrical lens. Whilst allowing for the above two factors, Jackson considers that a third and very important element in the case is a real narrowing of the lumen of the vein, due to a thickening in its wall, as a result of the arterial impulse continually hammering away at the vein, its effect being exaggerated by the heightened arterial pressure, and the rigidity of the wall. The criticism of this suggestion would be that other writers have shown reason to believe that arterio-sclerosis is not associated with an increase in the pressure within the eye; indeed, Moore has shown that the arterial pulse in the eye is greatly damped down by the presence of arterio-sclerosis. Jackson does not say whether he has anatomical evidence for his belief "that these narrowings are thickenings of the venous wall;" he observes that they are met with in eyes which are free from arterio-sclerosis, and which must indeed be considered to be normal, and he is disinclined to attach too much weight to their testimony, unless they are supported by some other evidence. He does not agree with Gunn either on the importance of the distension of the veins to the distal side of crossing arteries, or on the increased liability to hæmorrhage in such localities. Sometimes the veins show no such distension on the distal side, and sometimes any distension present is found on the proximal side. Nor does he agree with Bull that arterio-sclerosis is a cause of retinal aneurysms; his very extensive experience is dead against such a view. He emphatically agrees with Bull's opinion that hæmorrhages are much more often met with at an early stage of arterio-sclerosis than later, when the walls have become thickened and the pressure has grown less owing to the rigidity of the large trunks. He has observed an important early sign of angio-sclerosis, *viz.*, "a dirty brick-red colour of the optic disc, due to enlargement of the capillary vessels"; he has noticed this appearance four years before any evidence of general circulatory disturbance or renal disease had been recognized, and two years before there were other ophthalmoscopic evidences of arterio-sclerosis. He admits that such discolorations are relative, and that it is not wise to place too much dependence on them. With reference to phlebo-sclerosis, he says (1) it is the adventitia, and not the intima which is most constantly and extensively affected, (2) narrowing and dilatation of the blood column is patchy and partial, (3) the opacity of the vessel walls sometimes appears as white lines parallel to the vein, or as a greyish translucent blanket, which obscures the crimson colour of the blood.

Enough has been said to show that the paper is one of considerable interest. Whilst there are individual points in it which are open to challenge, it comes from the pen of a man who never writes for the sake of writing, and who always commands respectful consideration for any views which he champions.

R. H. ELLIOT.

V.—GLIOMA OF THE RETINA.

Meller, J.—On retrogression of glioma of the retina. (Ueber Rückbildung von Netzhautgliom.) *Centralbl. f. prak. Augenheilkunde*, May, 1915.*

Meller, of Vienna, adds another to those extremely rare cases in which, short of actual cure, glioma of the retina undergoes, from some cause or causes unknown, a retrograde metamorphosis, but without coincident shrinking of the eyeball.

Meller's patient, a lad of four years, was first seen on July 20th, 1910, suffering from glioma of the right eye. No complaint was made of the other eye, but aware of the frequency with which the disease is bilateral, Meller made a routine examination with the ophthalmoscope. It was found to be affected with the disease. There were no vitreous opacities. In the lower hemisphere of the fundus were three nodules, of various sizes, projecting into the vitreous, and including large tortuous vessels. Hirschberg's sign was also present—that is to say, enlargement and tortuosity of the blood-vessels passing from the optic disc towards the gliomatous nodules. Enucleation of the two eyes was refused by the parents. In order to do something, two applications of *X*-rays were made, potassium iodide was given internally, and the lad was sent for a change to Bad Hall.

Less than two months after the child was first seen, it became necessary to remove the right eye, on account of the tension, pain, and inflammation associated with secondary glaucoma.

When seen at the end of March, 1914 (*i.e.*, forty-four months after the first examination), the lad was well-grown, and of good average intelligence. The vision of the remaining eye, which was normal externally, was 1. The foci of glioma were still present, although they had undergone a remarkable change in appearance, having become flattened, so as to resemble patches of choroiditis. From the last-named, however, they differed in being made up of crumbly, chalk-like masses. The tortuous vessels formerly present in the masses had as good as disappeared. Hirschberg's sign, also, was no longer visible.

Pathological examination of the enucleated eye showed that it was the seat of a typical glioma exophytum, accompanied by secondary glaucoma.

The favourable results in this case are thought by Meller to be due to some factor, the nature of which is still beyond our ken. In his opinion, the application of the *X*-rays had nothing to do with the matter.

He gives references to somewhat similar cases by Wintersteiner, Deutschmann, and Axenfeld. SYDNEY STEPHENSON.

VI.—EPIBULBAR GROWTHS.

(1) **von Hoor, Karl.—The malignity of pigmented tumours of the eye. (Zur Malignität der gefärbten Tumoren des Auges.)** *Klin. Monatsbl. f. Augenheilkunde*, May, 1913.

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* A translation of Meller's article was published in *The American Journal of Ophthalmology*, July, 1915, p. 193.

(2) **Boulai.**—The relative benignity of superficial melanotic carcinomata of the eyeball (three cases). [Benignité relative des carcinomes mélaniques superficiels du globe oculaire (trois observations).] *La Clinique Ophtalmologique*, 10 mars, 1914.

(1) **von Hoor**, of Budapest, reports the case of a girl who complained of the presence of a small wart on her eye. This was one of three brown spots situated at the limbus of the right eye, and was supposed to be a birthmark. The author diagnosed nævus pigmentosus with metastases, but on removal of the latter, he found the characters of an alveolar melanotic sarcoma. Radical treatment was recommended, but refused. He lost sight of the patient for some months, but in the interval the original "wart" was removed by Fuchs, who found it to be a pigmented nævus, and thought it non-malignant. Shortly thereafter, however, the preauricular gland became the seat of a melanotic sarcoma. This was removed, but the other glands became involved, and death supervened.

The writer points out that this case shows that a pigmented birth-mark at the limbus may become malignant; that this change may occur in quite early life; and that metastases may appear at a period when the malignant metamorphosis has scarcely begun, so that histological examination of the original tumour does not raise suspicion. A. J. BALLANTYNE.

(2) **Boulai,** of Rennes, comes to the following conclusions regarding superficial melanotic carcinomata of the eyeball.—The evolution of melanotic carcinoma, the starting point of which appears to be superficial with regard to the sclerotic, is an extremely slow one. This tumour should not certainly be left alone, but it should simply be closely watched, and destroyed with caution, if one may put it that way (*détruite avec circonspection, si l'on peut ainsi dire*). Such caution is not incompatible with the careful application of galvano-puncture, which seems to be the best procedure. In any case, a radical operation, such as enucleation, should not be practised except after prolonged observation of the tumour, and when there is serious and certain threatening of propagation or of generalisation. ERNEST THOMSON.

VII.—ANGEIOID STREAKS IN THE RETINA.

(1) **Bayer, Heinrich.**—Angeioid pigment streaks in the retina. (Zur Frage der angioiden Pigmentstreifenbildung der Netzhaut.) *Klin. Monatsbl. f. Augenheilkunde*, June, 1913.

(2) **Spicer, W. T. Holmes.**—Angeioid streaks in brother and sister; a suggestion that the streaks are non-vascular. *Proceedings of Royal Society of Medicine: Section of Ophthalmology*, Vol. VIII, No. 3, p. 33.

(1) **Bayer,** of Freiburg, describes and figures the fundus appearances in two cases of this somewhat rare condition. In each case the disc was surrounded by a narrow black pigment ring, from which lines of about the same thickness as a retinal vessel passed out into the fundus in different directions. Some of them branched like vessels. Where they were crossed by retinal vessels, they always lay at a deeper level. Here and there the pigment streak was replaced, for some part of its course, by a red streak, almost indistinguishable from a blood-vessel. No hæmorrhages were found.

Hitherto, two cases of this condition have been examined pathologically, and in the light of his own cases, which were examined only clinically, the author discusses the views advanced as to the pathology. Lister and Magitot, the two authors who have had the opportunity of examining their cases pathologically, differed as to the origin of the lesion. The former found new-formed vessels in the retina with thick pigmented walls, while the latter found numerous hæmorrhages in the deeper layers of the retina, which he believed to be converted into pigment lines. Both of these views have been supported to some extent by clinical observations, but the author of the present paper does not think either of them satisfactory. As regards the ætiology, no general affection appears to be responsible, tubercle and syphilis being usually excluded, and the results of examination of blood and urine are negative. Arteriosclerosis appears to be excluded by the fact that the subjects are usually under 45 years of age. A. J. BALLANTYNE.

(2) **Spicer**, of London describes two cases of angeioid streaks in brother and sister, in each of whom they appeared at about 35 years of age. In the case of the man, a streak was interrupted at one point by an area of choroidal atrophy, an observation that, in the author's view, supports the theory that the streaks represent lines of choroidal pigment and not blood-vessels.

SYDNEY STEPHENSON.

VIII.—TUMOURS OF THE MEIBOMIAN GLANDS.

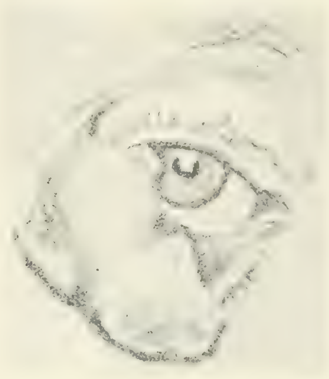
(1) **Scheerer, R.—A contribution to our knowledge of the tumours of the Meibomian glands. (Ein Beitrag zur Kenntnis der Geschwülste der Meibomschen Drüsen.)** *Klin. Monatsbl. f. Augenheilkunde*, January, 1914.

(2) **Fehr. — On adenomata of the eyelids. (Ein Beitrag zu den Adenomen der Lider.)** *Centralbl. f. prak. Augenheilkunde*, January, 1915.

(1) **Scheerer,** of Tüblingen, saw a patient, 63 years of age, with a growth in the lower lid of one year's duration. It formed a hard nodule, somewhat resembling a large chalazion. The treatment consisted in the removal of the tumour with the greater part of the lid, the gap being filled with an ear cartilage graft and a skin flap. Microscopic examination showed that the growth was a carcinoma of the Meibomian glands.

A feature of these cases is that the skin is intact, and this, added to the appearance of a yellow body shining through the conjunctiva, leads to confusion with chalazion. In the present case, the malignant nature of the tumour was suspected on account of the position of the thickening, which extended to the whole lid margin and beyond the convex border of the tarsus and from the presence of atrophy of the skin of the lid margin and its adhesion to the underlying structures. Carcinoma of the Meibomian glands does not generally lead to involvement of the regional lymphatic glands; pain is not a prominent feature; and recurrences after removal are not common. In the early stage, the nature of the tumour can be recognised histologically by its relation to the Meibomian gland. Later, when all traces of the tarsus and the glands have disappeared, the lobulated arrangement of the tumour and the characters of its cells are reminiscent of the Meibomian glands. A. J. BALLANTYNE.

(2) A female, aged 65 years, consulted **Fehr**, of Berlin, on account of a voluminous tumour of the right lower lid which had begun as a little "pimple" nine years before and had slowly enlarged, especially during the last couple of years. A hard tumour, of reddish-brown colour, was attached by a long narrow pedicle to the outer two-thirds of the edge of the lid without encroaching upon the conjunctiva or the skin in the neighbourhood. The eyelid was pulled out of shape by the weight of the growth. The last-named measured more than 3 cm. in length, 2 cm. in breadth, and 1 cm. in height. Its general appearance is shown in the accompanying figure. The cornea was clear. The fundus was normal. Vision was 5/20. Although an exact diagnosis could not be made, yet malignancy could be excluded. The growth was removed, and the patient made a good recovery. No relapse occurred during the period of about a year during which the woman was kept under observation. The somewhat detailed pathological description given by Fehr may be summed up by stating that the tumour, which was encapsulated, was composed in the main of gland tissue. It was, in fact, a typical adenoma, although whether originating from the Meibomian glands or from the sebaceous glands of the edge of the lid, the author was unable to decide with certainty.



SYDNEY STEPHENSON.

IX.—REMEDIES.

(*Ninth Notice.*)

(1) **Darier, A.—The indications for tuberculins and anti-tuberculous serums respectively in the treatment of ocular tuberculosis. (Indications respectives des tuberculines et des sérums anti-tuberculeux dans le traitement des tuberculoses oculaires.)** *La Clinique Ophtalmologique*, octobre, 1914.

(2) **Lotine, A. W.—Tuberculous keratitis and treatment by tuberculin. (Les kératites tuberculeuses et leur traitement par la tuberculine.)** *La Clinique Ophtalmologique*, octobre, 1914.

(3) **Neves da Rocha.—The employment of euphthalmine in nuclear cataract.** (L'emploi de l'euphtalmine dans les cataractes nucléo-**laires.**) *La Clinique Ophtalmologique*, octobre, 1914, originally published in *Revista Medico-Cirurgica do Brasil*, and translated into Spanish in *Annales de Oftalmologia*, No. 8, 1913.

(4) **Cheney, Frederick E.—The treatment of glaucoma simplex.** *Ophthalmology*, April, 1915.

(5) **Bock, Emil.—Tubercle of the iris cured by immune bodies (Dr. Karl Spengler). [Tuberculosis iridis mit Immunkörper (I.K.) Dr. Karl Spengler geheilt].** *Centralbl. f. prak. Augenheilkunde*, June, 1915.

(6) **Pollock, W. B. Inglis.—On dissolving senile cataract in the early stages.** *Transactions Ophthalmological Society U.K.*, Vol. XXXV, 1915, p. 331.

(7) **Weidler, Walter Baer.—The present status of tuberculin therapy in ocular tuberculosis.** *New York State Journal of Medicine*, September, 1915.

(8) **Barrie, T. Stewart.—A case of rotatory nystagmus with recovery under optical treatment.** *British Medical Journal*, September 25th, 1915.

(1) This excellent article by **Darier**, of Paris, is largely a review of the position in which we stand at present in the matter of tuberculin treatment. He commences by giving the results of Herreschwand, Bernheimer, von Hippel (*père*), Hertel, Reiff, Lotine, Josselius, Schieck, Pines, and of Bernheimer and von Hippel by means of tuberculin therapy. Some personal cases are related, and, finally, there are three pages on the choice of a tuberculin. The author's views seem to be pretty well crystallised in the following words, although they do not occur at the end, but in the middle of the article:

"It is admitted now that tuberculins have no immunising action properly so-called. The management of specific medication is of a most delicate character and demands true competence and ideas about biology and biochemistry which are not always found in the equipment of every practitioner.

"It is not enough to say 'Here is a tuberculous iritis, we must inject tuberculin.' It is, above all, necessary thoroughly to ascertain the pathological peculiarities and individual reactions of the case. It is possible for a case that will be unfavourably influenced by the most minute doses of tuberculin to obtain rapid and very marked relief by five or six injections of anti-tuberculous serum. I have observed this several times. It is very important when the question arises of proceeding to the application of specific medication, to know from the very beginning whether a vaccine or a serum should be used.

"In a general way, sera are indicated in acute febrile manifestations, and vaccines in atonic, chronic, but well localised processes. But it often happens that precise therapeutic indications can only be reached by trial and error (*tatonnement*) and the exercise of the clinical sense. Many cures have been barren or interrupted too soon because the particular tuberculin chosen was badly tolerated by a patient refractory to such and such a tuberculin."

The serum referred to by Darier is that of Marmorek. The use of this serum had better be studied in original works, such as that of Fromaget and Verrey (see *La Clinique Ophtalmologique*, 1913), or of Darier himself in the article at present under review. Anaphylaxis is very liable to occur if great care is not taken. ERNEST THOMSON.

(2) **Lotine,** of Petrograd, claims to be able to distinguish clinically in many cases of interstitial keratitis those which are tuberculous from those which are syphilitic. He admits that in a proportion of cases such distinction is not possible. It hardly seems worth while to quote his description of the

type which may be expected to be tuberculous. It seems to correspond with a keratitis which in the present day would be suspected to be tuberculous by most clinicians. The treatment adopted does not seem to call for comment.
S. E.

(4) This paper by **Cheney**, of Boston, is largely a plea for the systematic employment of myotics, rather than of operation, in the treatment of glaucoma simplex. He naturally lays great stress on the importance of keeping the sound eye under observation in order to detect the earliest evidences of the disease. Especially in elderly people, where the expected duration of life is not great, so long as the disease, as indicated by the central vision and the field, can be controlled by a myotic, it is best, he says, to stick to this treatment and not resort to operation, even although the tension is somewhat above the so-called "normal." The risks inherent in all operations must be put into the scale when deciding on the line of treatment. He thinks there is reason to believe that myotics have a beneficial action apart from their effect on the pupil. A. J. BALLANTYNE.

(5) A couple of years ago **Boch**, of Laibach, published in the *Wiener med. Wochenschrift* (1913, Nos. 19 and 20) an account of the good results he had obtained in cases of scrofulous or tuberculous diseases of the eye by inunction of immune bodies, according to Dr. Karl Spengler. In the present communication Boch emphasises the value he attaches to this preparation, and in support of his views, relates at some length the cure of severe tuberculous irido-keratitis in a lad, thirteen years of age, where the ocular mischief was complicated with phthisis pulmonalis. SYDNEY STEPHENSON.

(6) The conclusions given by **Pollock,** of Glasgow, are as follows:

"In a consecutive series of 100 patients with senile cataract, who were under treatment for not less than three months with alkaline lotions and dionine, fibrolysine, or iodolysine drops, 45 per cent. of 178 eyes showed a great improvement, 41 per cent. an improvement, and 7 per cent. remained stationary. In 8 per cent. the treatment failed to arrest the progress of the cataract.

"This method of treatment does not cause pain; and patients are easily encouraged to persevere with it for prolonged periods. Attention should be given to the general health. The internal administration of an alkaline mixture is also of advantage.

"Several patients have remained clear of recurrence for a period of from three to six years." SYDNEY STEPHENSON.

(7) Few will be found to disagree with the aphorisms laid down by **Weidler**, of New York City, at the outset of a very practical communication upon the present status of treatment by tuberculin in tuberculosis of the eye. They are as follows:—(1) that, as a means of cure, tuberculin has a limited sphere of utility in general and pulmonary tuberculosis; (2) that a positive reaction to tuberculin indicates the existence of a tuberculous focus or of tuberculous toxins; and (3) that tubercle as a cause of eye disease is more generally accepted than it was ten or twenty years ago.

Weidler has employed bacillary emulsion during a period of three years, and has treated by that means a series of 117 cases, including affections of the conjunctiva, the cornea, the sclera, the iris, the ciliary body, the retina, and the choroid. The author is far from claiming that all of the conditions treated and cured by the bacillary emulsion were cases of undoubted ocular tuberculosis. It is more to the point to note that, with one exception, in not a single case where a positive reaction to tuberculin was obtained, did he fail to stop the progress of the ocular lesion. His experiences with tuberculin in cases of phlyctenulosis of the conjunctiva or cornea, combined with the local and general measures usually carried out, have been happy. Recurrences may, nevertheless, take place.

That Weidler is no half-hearted advocate is shown by the following quotation :—" The ophthalmologist who is not using tuberculin as a diagnostic agent and as a therapeutical measure, is not practising modern ophthalmology."

SYDNEY STEPHENSON.

(8) Some fourteen months after the correction by spectacles of hyperopic astigmia in a child of 7 years, **Barrie**, of Glasgow, found that the rotatory nystagmus, said to have existed since birth, had disappeared. It may be noted that the child was very fair, and that the fundus of each eye showed well-marked choroidal vessels. SYDNEY STEPHENSON.

BOOK NOTICES.

The Ophthalmic Year Book, Volume XI, containing a Digest of the Literature of Ophthalmology for the Year 1914. Edited by EDWARD JACKSON. Illustrated. Published with assistance of the Knapp Testimonial Fund of the Section on Ophthalmology of the American Medical Association. Herrick Book and Stationery Company, Denver, Colorado, U.S.A. 1915. Price 10 dollars.

We extend the heartiest possible welcome to Volume XI of Edward Jackson's " Ophthalmic Year Book," a work indispensable to any ophthalmic surgeon who is not wholly indifferent to the literature of his speciality.

The volume contains no striking references to the great European War, mainly because the war did not break out until after the middle of the year 1914. As the preface remarks, the world is no longer dependent upon Germany, Austria, and France for the literature of ophthalmology, and it is now evident that America has begun to contribute an important part of the world's ophthalmic literature. The increased size of the volume (it now contains 545 pages) is in part due to the influence of the war. Thinking that the reduction of the French and German output would diminish the size of the Year Book, some of Jackson's collaborators have allowed themselves more freedom than usual in presenting at greater length the material that they had to handle.

A list of subscribers in advance for this volume is printed towards the end of the book. It is difficult to credit the fact that in a list of 269 names only six are to be found who belong to the British Empire (London 3, Wales 1, Australia 1, and India 1). SYDNEY STEPHENSON.

Ophthalmoscopic Diagnosis for General Practitioners and Students. By GEORGE W. JEAN. Sixty-eight illustrations. E. B. Meyrowitz : London, New York, and Paris. 1915. Price 4s. 6d. net.

A glance at Dr. George W. Jean's small book predisposes one in its favour, since a clever and attractive use has been made of type, and it contains, besides, many illustrations that have been chosen with care and discrimination. The author's " constant endeavour has been to be concise and practical," and a perusal of the book convinces the reviewer that he has succeeded in both objects.

It is hoped that Jean has authority for the statement made on page 29: "The advice to press on an eye with your finger to elicit venous or arterial pulse is vicious, since blindness has been produced by persistence in this procedure." Again, if inclined to be hypercritical, we might query the statement (page 26) that "any pigment that seams the disc is not pathological." Describing the characteristics of a glaucoma cup, it is not everybody, perhaps, who would endorse the statement made in this book (page 46) that "any excavation whose margin reaches the disc margin at any point (except temporarily) is a glaucoma excavation," still less that to be found on the following page: "The short bend of a single vessel immediately at the disc edge is sufficient in every case for the diagnosis of glaucoma," although as the sentence last quoted is in inverted commas, the author may have taken it from some source without formal acknowledgment.

The directness of the author's statements may be judged from one pithy sentence, as follows: "Let it be distinctly understood that there is no pathognomonic retinal picture of Bright's retinitis. . . . The star is characteristic and suggestive, but not pathognomonic of albuminuric retinitis." Again, "men often speak of the arteries or veins on the disc as being altered in cases in which they see nothing else pathological. Beginners must remember that no diagnosis is made from changes in the disc vessels alone. If the vessels are pathologically changed, the disc or the retina will also show pathological changes."

The little book (it contains 123 pages only) can be recommended with confidence to those for whom it was primarily written.

SYDNEY STEPHENSON.

Fibrositis (Gouty, Infective, Traumatic), so-called Chronic Rheumatism. By LL. JONES LLEWELLYN and A. BASSETT JONES. Royal 8vo. 25s. Heinemann. 1915.

For the authors of this comprehensive volume "fibrositis" is the all-embracing name of inflammatory disease of every organ in which fibrous tissue is present. In accordance with this vast conception, a differentiation is drawn between infective or toxic types of fibrositis and traumatic varieties. Under the former, so-called chronic rheumatism, are comprised the articular, neuralgic, and muscular forms, and the basal fibrous hyperplasia, common to all, links together the disconnected clinical entities—lumbago, sciatica, torticollis, pleurodynia, etc.—each and all being the outcome of subinfection by germs of attenuated virulence. The multiplicity of the sources of chronic rheumatism is no new view, and among the earliest investigators to throw doubt on the anciently accepted relationship of acute to chronic rheumatism were the ophthalmologists, who pointed out that so-called "rheumatic iritis" was in a large number of cases gonococcal in origin, and that acute rheumatism had little, or possibly no, relationship with iritis. For some time past the adjective "rheumatic," as applied to irido-cyclitis, has become obsolete with a section of ophthalmic surgeons. The recognition of the gonococcal origin of a certain percentage of cases of "rheumatic" iritis suggested the probability of staphylococcal infection as the source of others, and the search for germs was undertaken in all obscure cases of iritis.

The chapter on malingering in fibrositic disease will be one to which many will turn in the consideration of pensions and "blood-money" when storm and stress are no longer the daily routine of our sailors and soldiers. This chapter we should like to see very much extended, for in spite of recent books on the subject, there is still room for an authoritative monograph in the English language.

Neuralgia and neuritis are differentiated as entities distinct from each other, but so shadowy is the film of demarcation, that the former word might have been left to connote nothing more than its derivative meaning of nerve-pain.

The book is primarily intended for the physician and surgeon, but the ophthalmic surgeon, whose daily work is interwoven in the warp and woof of general medicine, will find it well worth careful study.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

CRYPTOPHTHALMIA.

To the Editor of THE OPHTHALMOSCOPE.

DEAR SIR,—Since publishing the two cases of Cryptophthalmia in THE OPHTHALMOSCOPE, Vol. VIII, No. 4, April 1st, 1910, p. 259, there has been a male child born to the same parents on June 15th, 1912.

At birth the baby weighed 8 lbs., and was perfectly formed in every way except the eyes. The tissue at the point of union has the appearance of scar-tissue, and a few cilia can be seen on the imperfect margin of the upper and lower lids, and the caruncle is partially formed. There is a slight depression or pitting of the skin of the upper lids, and there are no puncta. Orbits are slightly narrowed. On palpation, a small eyeball can be felt deep in the socket.

No opening can be detected along the palpebral fissure. When a light is flashed on the face, there is a slight movement of the eyelids. The formation of the lids and orbits of this child is in every way like the mother and daughter, as described in cases Nos. 1 and 2.

If you think this third case is of sufficient interest to publish, kindly make a note of it in THE OPHTHALMOSCOPE.

Respectfully,

DAVID H. COOVER.

METROPOLITAN BUILDING,
DENVER, U.S.A.

WHAT IS AN "OPHTHALMOLOGIST"?

To the Editor of THE OPHTHALMOSCOPE.

SIR,—I am afraid that Dr. Ernest Thomson will again decide that I am hard to "please" when I say that his efforts to enlighten me have not proved very successful. All the same I hope he will not believe me ungrateful. If, as the last line of his letter proposes, an "ophthalmologist" is merely someone "specially interested in ophthalmology" the word is inevitable, and I do not propose to quarrel with it. But as such a definition must include many anatomists, many physiologists, many physicians, many surgeons, many ophthalmic surgeons, and many general practitioners, not to mention opticians, optologists, and the Spectacle Makers' Company, it is obvious that "ophthalmologist" does not correctly describe as such, a person engaged in a particular branch of medical practice. Its concern is with personal and individual "studies" and "interests," and not with professional occupation. In similar fashion a medical practitioner may be a "botanist" or a "microscopist" or a "philanthropist," but none of these terms would be used to indicate his professional activities. And in naming practitioners in their technical capacities, it is not their "studies" or their "interests" we want to announce, but the character of the work which they undertake. As Dr. Thomson asks the question I readily admit the accuracy, in certain circumstances, of such names as "anatomist" and "physiologist"; but I fail to see how these are relevant to the present discussion, as they are not terms descriptive of medical practice, and it is with the naming of a group of medical practitioners that he and I are now concerned. My objections to the use of the word "ophthalmologist" for this purpose may be stated in a few words. First, in relation to practice I not know what it means. Is its concern with medicine, or with surgery, or with both of these, or with neither? In one of his two definitions, Dr. Thomson, it is true, says that an "ophthalmologist" is a "practitioner of ophthalmology"; but this is a mere *circulus in definiendo* and a worthy rival of the classic which tells us that an archdeacon is a person charged with archidiaconal duties. Secondly, the name, as a classification of practitioners, is unnecessary, for if a man practises as a physician, or as a surgeon, or as an ophthalmic surgeon, or if in some fashion he combines these arts, why not say so? In the third place, applied in medical practice, the term is objectionably exclusive, seeing that, at least according to Dr. Thomson's proposal, it implies the restriction of a special interest in ophthalmology to those who elect to carry this particular label. Finally, is the consideration that as a professional name "ophthalmologist" is destitute of legal protection, and that it is as free to an unqualified person as to Dr. Thomson himself. I will name no names, but Dr. Thomson and myself know well two practitioners who take a "special interest in ophthalmology," and each of whom, therefore, according to one of his definitions, must be an "ophthalmologist." Yet on turning to the Medical Directory, I find that one of these practitioners calls himself a "physician," while the other styles himself an "ophthalmic surgeon." And Dr. Thomson, I am sure, will agree that each of them tells the truth.

I am, Sir,

Yours sincerely,

LONDON, W. C. O. HAWTHORNE.

NOTES AND ECHOES.

Deaths. WE regret to announce the death of William John Cant, of Lincoln, on October 7th last at the age of 59 years. Dr. Cant, although not an ophthalmic surgeon pure and simple, was a life member of the Ophthalmological Society of the United Kingdom, and had served upon the Council of that

Society from 1898 to 1901. He had written upon a number of eye subjects, such as trichiasis and conical cornea.

With much regret we announce the death of Alphonse Péchin, aged 63 years. Dr. Péchin had written widely and lucidly upon subjects appertaining to ophthalmology. He was president of that active and useful body, the General Syndicate of French Oculists.

The following deaths are also announced from the Continent of Europe:—Adolf Weber, of Darmstadt; C. Harms, of Tübingen; Jakob Stilling, of Strassburg, aged 73 years; Georg Haltenhoff, of Geneva, aged 72 years; Julius Arnold, of Heidelberg; v. Prowaczek, aged 40 years; Wilhelm Wagner, formerly of Odessa.

The deaths of the following ophthalmologists are announced from the United States:—Sherman Veerhees, of New York, aged 48 years; L. R. J. Coria, of Minneapolis, aged 34 years; John A. Kenney, of Wilkes-Barre, Pa., aged 40 years; Charles W. Norris, of Lexington, Ky., aged 54 years; W. E. Klokke, of St. Louis, aged 39 years.

* * * *

Archivio di Ottalmologia

We are glad to observe that the *Archivio di Ottalmologia* will continue to be published despite the fact that the editor and the staff have responded without exception to the appeal of Italy for men. Captain Folina, Lieutenant Carotenuto, and Sub-Lieutenant Rossi have already been ordered to the front.

* * * *

Pacific Coast Oto-Ophthalmological Society.

At the annual session of this Society, held in San Francisco, a gavel was presented on account of Colonel R. H. Elliot, of London. The gavel had been fashioned from an oaken timber out of old London Bridge, and upon its silver bands were chiseled a series of names of the great investigators in the field of glaucoma. Colonel Elliot was unanimously elected to honorary membership in the Society.

* * * *

Appointments.

H. C. Mooney has been appointed surgeon oculist in ordinary to the Viceregal Household of his Excellency the Lord Lieutenant of Ireland.

Mr. H. L. Eason has been appointed consulting ophthalmic surgeon to the Mediterranean Expeditionary Force. He has been granted the rank of temporary Lieutenant-Colonel.

* * * *

A New Ophthalmia School.

A school for the education of children suffering from ophthalmia, the first of its kind to be opened in the North of England, has been installed at Rose Hill, Northenden. The institution will be maintained by the Manchester Board of Guardians. It is proposed that a child entering the school shall remain there, if necessary, until it reaches the age of sixteen years. It may well be asked what becomes of these diseased children after that age. Are they to be permitted to drift along, as was once the case in London, possibly with diminished eyesight and certainly with reduced wage-earning value? There was a time when in London almost every adult affected with trachoma who attended hospital could be proved, on enquiry, to have been an inmate of a poor-law school when a child. In plain English, they had been discharged from those institutions with the trachoma still in a state of activity.

* * * *

The Incidence of Glaucoma.

IN a letter to the Editor of the *Lancet*, under date September 18th last, Mr. Kenneth Campbell, of London, states that during the past three months he has seen four times as many fresh cases of glaucoma as in the corresponding quarter of any year, and that a large proportion of the patients have relations serving in the war. He asks whether others have remarked the same occurrence.

* * * *

Dr. S. Lewis Ziegler.

DR. S. LEWIS ZIEGLER, who since the beginning of the year has occupied the onerous post of director of the Department of Public Health and Charities of the city of Philadelphia, received only the other day the honorary degree of LL.D. from Lafayette College.

* * * *

The Middlemore Lecture.

MR. T. HARRISON BUTLER, editorial secretary of THE OPHTHALMOSCOPE, who will deliver the Middlemore Lecture on December 7th, 1915, at the Birmingham and Midland Eye Hospital, has chosen as his subject one upon which he is particularly well qualified to speak, owing to long residence at Jerusalem, namely, "Some Aspects of Ophthalmology in Palestine."

* * * *

A Railway Danger.

WHAT has been preached for years by ophthalmic surgeons, namely, the importance of periodical tests of sight in engine drivers over sixty years of age, has been brought prominently forward recently by Lieutenant-Colonel Druitt, the Board of Trade Inspector, in an official report on the collision between two trains at Pollokshaws, whereby one passenger was killed and twenty-five were injured. It is important, states Colonel Druitt, that tests should be made periodically, say, every two years, in men over sixty, and after the age of sixty-five, annually.

* * * *

The Blind of the United States.

THE Department of Commerce Bureau of the Census of the U.S.A., publishes (1915) a bulletin on "The Blind Population of the United States of America, 1910." As might have been anticipated, it is a document full of interesting information, but it is not easy even to discuss it. A comparison with previous American [illegible]s returns, this being the ninth, is acknowledged to be unsatisfactory, and that for the usual reason, *viz.*, that the methods employed have been far from uniform throughout. The figures of foreign countries are considered, and then the geographic distribution of the blind throughout the States is taken up. The sex, the age, the race, and the nativity of the blind are systematically dealt with, nor does the country of birth of foreign-born whites escape attention. Finally, the marital condition of the blind and their occupations receive a due mead of attention. The communication is illustrated by a map, and is copiously supplied with tables.

* * * *

Dr. James Ryley's Will.

THE late Dr. James Ryley, ophthalmic surgeon to the Great Yarmouth Hospital, and sometime mayor of that town, whose death was announced in THE OPHTHALMOSCOPE for September, left estate valued at £18,351.

THE OPHTHALMOSCOPE DIARY.

	1915.	
Royal Society of Medicine: Section on Ophthalmology	Nov. 3rd	1, Wimpole Street, W.
Midland Ophthalmological Society.	Dec. 7th	Birmingham.
	1916.	
Royal Society of Medicine: Section on Ophthalmology	Feb. 2nd	1, Wimpole Street, W.
Ophthalmological Society of the United Kingdom.	May 4th, 5th & 6th	London.
American Ophthalmological Society.	May 9th & 10th	Washington, D.C.
Royal Society of Medicine: Section on Ophthalmology	June 14th	1, Wimpole Street, W.
Oxford Ophthalmological Congress.	July 12th, 13th & 14th	Keble College, Oxford.

THE

OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. XIII.—No. 12.] *DECEMBER 1, 1915.* [TWO SHILLINGS.

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ORIGINAL COMMUNICATIONS.

ON THE PAPILLŒDEMA IN GUNSHOT INJURIES OF THE VAULT OF THE SKULL.*

BY

WALTER H. JESSOP, M.B., F.R.C.S.,

SENIOR OPHTHALMIC SURGEON TO ST. BARTHOLOMEW'S HOSPITAL, LONDON, ENGLAND.

Introduction.

IN this war wounds of the head by bullet and shrapnel have been more frequently met with than in any other war before. This has been largely due to trench warfare and the consequent exposure of the head at times to enfilading fire, or to the careful shooting of the sniper. Such wounds of the vault of the skull frequently are complicated by depressed and fissured fractures.

On examining the eyes of such patients, I was surprised to find so large a proportion showed signs of papillœdema.

In the following remarks I include only cases of vault injury, and wish to exclude the terms "optic neuritis" and "choked disc." The unscientific method of dividing such cases into "optic neuritis," when the swelling of the optic disc is less than 2 D., and "choked disc," when it is more than 2 D., may now be relegated to obscurity.

Paton and Holmes (*Brain*, Vol. XXXIII, p. 427) have demonstrated in intracranial tumours that the swelling of the papilla is an œdema and not an inflammation, and that, therefore, the term "papillœdema" is a much more correct and convenient one.

All these cases fall under the category of papillœdema, and it is questionable even in toxic inflammations, whether the condition of the papilla is ever due to inflammation and is therefore a "papillitis."

As will be seen later, œdema of the papilla results in these cases from increased intracranial pressure, and such œdema is relieved by trephining, decompression, or lumbar puncture.

In most of my cases the swelling of the optic disc has been slight, generally about 1 D., and seldom more than 2 D., or at most 3 D. There have been rarely any other ocular signs or symptoms. Both optic discs have been affected, sometimes one more than the other. The changes were chiefly on and in the close neighbourhood of the disc, and acute in their onset. The papilla was pinkish in colour, the edges of the disc were indistinct and blurred, and the vessels were raised close to the edges.

In many cases there is a distinct, narrow, yellowish-white ring round the disc, having a blurred outline and evidently caused by œdematous effusion. There may be a striation of the retina near the disc. If there is a marked physiological cup, it may be partly or wholly filled up.

Retinal hæmorrhages are rarely met with, and are probably due to the diathesis of the patient; there are seldom patches or masses of effusion. If the light is good enough, the slight changes in the disc are much more easily and accurately diagnosed by direct ophthalmoscopic examination under daylight; no artificial illumination gives such a delicate and correct view of the disc, especially as to the texture and consistency.

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* Read at the Oxford Ophthalmological Congress, July 15th, 1915.

Occasionally, the slight swelling of the disc may be limited to one part, owing to developmental abnormalities of the lamina cribrosa. In one case there was a myopia in the right eye of 11 D., the refraction of the left eye being normal. This was interesting from the fact that there was a papillœdema of 2 D. in the left eye, whereas the right disc showed no signs of swelling. I have never before had the chance of examining an eye with myopia of 11 D. for papillœdema, and probably shall not find another case in the war, as such an amount of myopia should be unknown in the army. I should be much obliged if anyone could give me his experience of papillœdema in a high myope. Are there signs of swelling present or not? This patient died a week after his admission, and although papillœdema ought to have been present, I did not find signs after examining the eyes on two different occasions.

The vision in most cases is not affected. The colour-sense and the fields of vision are normal.

Prognosis.

On relief of the intracranial pressure, the ophthalmoscopic signs soon disappear. If there is physiological cupping, this becomes clear. The optic disc, as a rule, shows no sign of the swelling, the colour even being as before. In some cases the colour of the disc afterwards is distinctly pale and even white ; but there have been no signs of any optic atrophy, as shown by the vessels, acuity of vision, and fields of vision.

As to the percentage of papillœdema in cases of fracture of the vault, I should think it is probably about 65 or even more. In my own cases, numbering 47, papillœdema was found in 34 or 72.34 per cent. This is very likely too high, as probably mine were cases more or less picked as likely to have papillœdema. Colonel W. T. Lister gives 50 per cent. in his cases. Captain M. W. B. Oliver gave me at three separate times the percentages he found.—His first cases gave 75 per cent. papillœdema ; later, in 30 cases he found 16 or 53.3 per cent. ; and when his cases numbered 42, those in which papillœdema was present were 22, or 52.4 per cent. Of course these numbers are too few for accurate statistics, and Captain Oliver's cases show this in the alteration of percentage, as they increased in number.

My own cases were examined generally more than once, and, therefore, very slight disc changes seen at first, which might have been easily overlooked, were verified later on. If Captain Oliver's numbers and mine are added together, the percentage becomes 62·9.

In most cases, after the intra-cranial pressure had been relieved by decompression or trephining, the papillœdema subsided in five or six days, and in three weeks, all traces had disappeared.

In cases where the papillœdema lasted for a long time, in one case 2½ months, the cause was due to irritation kept up in the wound from bone sequestra, etc., necessitating secondary operations. I have seen cases in which the swelling of the optic disc increased after decompression, but this was due to fragments of bone, suppuration, etc.

Causation.

The cause of the papillœdema is increased intra-cranial pressure, and papillœdema is probably always present in cases of vault fractures with increased intra-cranial pressure. When this pressure is absent, I think there is, as a rule, no papillœdema. In most cases the papillœdema is due to œdema of the brain or to an increased amount of cerebro-spinal fluid distending the subarachnoid space of the optic nerve sheath, and may be the result of bleeding beneath the membranes.

As to whether a gunshot injury of the scalp can without fracture of the skull produce papillœdema, I am still not quite convinced. The impact of bullets on the skull, ever so slightly, may produce a fracture of the inner table, and I have never seen a case of papillœdema after head injury in which there might not have been a fracture.

Colonel Lister, who has had much more experience, says: "that papillœdema may follow concussion of the brain, quite apart from inflammation of the brain, is shown by the fact that swelling up to 1 or 2 D. may exist with grazing wounds when neither the bone nor the dura have been penetrated, and this may subside without any operation being done." If this is so, it must be due to swelling of the brain owing to concussion or hæmorrhage on the cortex.

The following case might be thought to be due to concussion alone, but I am sure there was a fracture.—Private F., on March 18th, had shrapnel head wound, and beyond thickening in wound no external signs of fracture of vault. He had severe headaches and much sickness which were put down to a slight attack of dysentery. The vision in each eye was 6/9. By ophthalmoscope, R.E. the optic disc swelling is 1 D., L.E. the swelling of optic disc is 2 D. I suggested from the papillœdema there had been a fracture of the vault, but the headaches, etc., were put down to the intestinal trouble. On July 2nd the patient was still in the hospital with headaches and giddiness, and the vision and the ophthalmoscopic signs were the same.

I have been unable to make out that there has been any connection between the side of the injury and the commencement of the papillœdema in either optic disc or in the amount of the swelling of the disc.

Are there any signs characteristic of the papillœdema seen in these cases of vault injury? In answer to this I should say the ophthalmoscopic signs of the papillœdema are rarely extreme. One sign I have often noticed is a ring of œdema round the optic disc, due, I think, to fluid in the nerve sheath.

On looking over my notes, I find the cases of marked ring round the optic disc have been associated with suppuration about the fracture; or, as in the case mentioned below, of suppuration beneath the dura mater.

And now to finish. Does papillœdema in a case of fracture of the vault demand immediate operation? This, in our present knowledge, is a difficult question to answer. The following case is one of the most instructive I have had, and I am sure if the operation had not been done at once, the man would not have made such a perfect recovery. In this case the chief reason that guided me was the œdematous ring round both discs. A private had a rifle bullet scalp wound of left frontal region on May 21st, 1915, and was admitted to No. 1 London General Hospital under Captain Wilson on June 1st. There was a suppurating scalp wound, but no headache, temperature, or sign of compression. On June 3rd, vision 6/6 in each eye. Ophthalmoscope: R.E. papillœdema with a marked narrow ring of œdema round the optic disc, the swelling of the O.D. was 2 D. L.E. papillœdema, swelling 1 D., although the ring round the disc was not so marked. Acting on the ophthalmoscopic examination, Captain Wilson opened up the scalp wound, and found a depressed fracture over the left frontal region of vault. The bone was trephined at the edge of depression, and depressed splintered bone (½ inch by ½ inch) and many small fragments of widely splintered inner table removed. Pus was seen to ooze from minute punctured wounds in dura, and on this being incised by a crucial incision, half an ounce of pus was evacuated.

The brain bulged slightly but pulsated freely. Intra-dural abscess was drained by a tube, and the wound partially sutured. Patient did well, and the papillœdema gradually subsided leaving no traces. Vision remained throughout 6/6 in each eye.

I am sure in every case the condition of the papillœdema ought to be carefully watched. In very slight cases, amounting to little beyond a marked blurring of the optic disc, any idea of an operation may be put off until the swelling becomes more marked. Lumbar puncture may often be resorted to, and in slight cases, will probably relieve the signs. It is, however, in cases such as the one outlined above that an operation should be quickly done.

EYE LESIONS AS A POINT OF IMPORTANCE IN DIRECTING SUSPICION TO POSSIBLE TRYPANOSOME INFECTION.*

BY

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LONDON, ENGLAND.

THE importance of eye lesions as one of the diagnostic signs of infection with trypanosomes is great, as, unless suspicion be aroused, the nature of the disease is likely to be overlooked, and unless treated energetically with specific lines of treatment, the infection terminates in the fatal stage of sleeping sickness. The earlier the disease is recognised, the greater the probability of recovery. The eye lesions vary and are not alone diagnostic, but the infections are usually small and the prolonged and repeated examinations necessary are not likely to be made unless there is ground for suspicion.

The grounds for suspicion are :—

(1) Continued pyrexia, which does not yield to quinine.
(2) Enlarged glands, usually cervical.
(3) An erythematous circinate rash.

Of these, the last is of most value for diagnostic purposes, and is usually, but not always, present in the early stages.

(4) Ocular symptoms (often absent throughout).
(5) Orchitis (often absent throughout).
(6) Delayed pain after deep muscular bruising (very variable).
(7) Cardiac irritability and weakness.

These signs may not all be present together, and in any case are not to be relied on for diagnosis ; but one or more of them, especially (2) and (3) and to some extent (4), are often enough to arouse suspicion, which must, however, be verified by blood examination and finding trypanosomes. In many points there is a similarity to syphilitic infection, and as a positive Wassermann may be obtained in some cases of trypanosome infection where the question of syphilis can be excluded, the correct diagnosis is of great importance.

A special reason for viewing eye lesions with suspicion is that they are the first in some cases to cause the patient to take a medical opinion, and the other signs may not attract attention, even if they are present.

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*A communication read on November 3rd, 1915, before the Section of Ophthalmology of the Royal Society of Medicine.

In a patient coming from Tropical Africa, as all these do, "fever" to them means malaria, and about this they think they know all that is to be known.

The enlarged glands are neither tender nor painful, and usually are not enough to attract attention.

The rash causes no irritation, is usually on a covered part of the body, and is taken for a bruise, which it sometimes resembles. The eye lesions are often painful and always noticeable and in practice have been the first signs that caused the patients in some of the cases here recorded to consult a medical man.

In the subjoined list of cases of Europeans seen in England with this disease, I am desirous for the above reasons ot urging the importance of excluding trypanosomiasis as the cause of some of the eye lesions in persons from Tropical Africa. I do not mean it to be inferred that this disease is the only, or even the most important, cause of such eye lesions. On the contrary, in several persons from West Africa, with some form of iritis, keratitis, etc., I have not only been able to exclude trypanosomiasis, but have been able to determine the actual causation and verify this exclusion by the effect of treatment and the subsequent course. In my list I include one case of iritis that I consider to be probably due to concomitant syphilitic infection, and I have little doubt that some of the others may be due to that or to other diseases. I give the list as it is, and my readers will all be able to make such deductions as they may think advisable.

I have grouped the cases according to the part of Africa where the disease was acquired. In the Rhodesian cases, the parasite, trypanosome, is specially virulent, and is probably a different species. Some consider that the parasites in some districts of Nigeria form a special species. This so far is not proved, but I give the group from all Nigeria separately. The eye lesions are essentially a toxic iridocyclitis, with this there is a varying amount of keratitis, circumcorneal congestion, conjunctivitis, and photophobia, which may be severe or trivial.

In some cases of infection with trypanosoma of the lower animals, similar eye lesions occur and recur according to treatment (*Journal of Tropical Medicine*, June 1st, 1911).

	Cases.	Deaths.	Eye lesions.	Percentage with Eye lesions.
Rhodesian Cases	6	6	5	83·3
Nigerian Cases	10	3	4	40·0
Uganda, Congo, and other parts of Tropical Africa	16	3	3	18·7
Total	32	12	12	37·5

In one of the Rhodesian cases and in three of the Nigerian cases it was the eye lesions that led the patients to seek medical advice, although other symptoms were present but not complained of, as one of these was in

South Africa, another in West Africa, one in England, and one in the U.S.A., and in none was attention directed to the possibility of the toxic agent being trypanosomiasis, I do not consider that I am going too far in stating that the existence of this dangerous source of toxin is not yet sufficiently appreciated.

One of the Uganda cases showed a peculiar form of choroiditis, found by Mr. Treacher Collins in 1908.

Another sign not uncommon in all forms of trypanosomiasis is marked œdema of one or other or both lower eyelids and beneath them. This is not associated with any lesions of the eye, albuminuria, or cardiac disease. It may be taken for a similar œdema that is not uncommon in another West Africa infection, that with Filaria loa.

I doubt if the list includes all the eye lesions in our cases, as for many years eye lesions were considered to be the result of the large doses of arsenic (as atoxyl) advocated by Koch and these in many cases led to optic atrophy and other eye lesions. In the lower animals and also in many with moderate doses of this drug, rapid improvement and disappearance of eye lesions results, although in lower animals (*loc. cit.*) if the treatment be discontinued, eye lesions recur.

Mr. Leslie Paton, who has kindly consented to read these notes to the Section, has seen with me, and I understand has shown at the Royal Society of Medicine (Section of Ophthalmology) one of the cases here tabulated. It was an ordinary case, with very slight photophobia and irido-cyclitis and nothing specially diagnostic as far as the eye was concerned, but he had the rash—"bruises" he called them—enlarged glands, and slight pyrexia. In his case, as in others, the eye trouble led him to take medical advice, suspicion was aroused, trypanosomes were found in the blood, and he has been under treatment for over fourteen months, and is himself now continuing the treatment in the trenches, although there has been no recurrence of the symptoms.

"CONCUSSION RUPTURE" IN WARFARE.—A WARNING.

BY

ARTHUR ZORAB,

SOUTHAMPTON, ENGLAND.

MANY cases have been described where the inner lining membranes of the eye have been found ruptured by the near passage of a high-velocity projectile, without any apparent damage of the sclerotic. Most of these cases have been due to the passage of a bullet through some part of the orbit, without the bullet itself having touched the eye. I have myself seen several such, but I here record two cases which may act as a warning. The diagnosis of "Concussion rupture" should, I think, only be tentative.

Cases.

Case I.—A. V. de B., a Belgian soldier, was wounded at the battle of the Yser in October, 1914. A bullet entered his face just at the external meatus on the right side, and emerged immediately internal to the right external canthus, so that it could hardly have actually entered the orbit. The right eye was rendered sightless. No external injury to the globe could be detected. The fundus could not be examined in detail, since there was much vitreous hæmorrhage. The eye was quiet. Left eye normal to all appearances. He had been seen by another surgeon during my absence and "Concussion rupture" diagnosed. I agreed.

Three months later, he came to me complaining that the left sight was getting misty. L. V. c. glasses=6/9. Right eye quiet. Left eye showed a faint pink circumcorneal zone, and a slight milkiness of the cornea. In view of the fact that the right eye manifested no inflammatory signs, I admitted the patient for observation for three or four days. As the left eye got steadily worse, I enucleated the right. It was too late. A slow but remorseless sympathetic ophthalmitis had set in. In spite of repeated injections of neo-salvarsan, of mercury inunctions, and cyanide injections in the subconjunctival space, the sight has steadily got worse. He now has a detachment of the left retina. Throughout the case the trouble in the left eye has never been more than "sub-acute."

After excision, on examining the right eyeball, a small healed puncture (probably from a spicule of bone) was found close to the optic nerve, toward the external aspect. There was a tiny bead of pus adherent to the internal aspect of the puncture. No bone or other foreign body was present in the eye.

Case 2.—A. H., a British soldier, was shot through the face by a bullet from a rifle or machine gun. The bullet entered at the lower margin of the left ala nasi, just about the level of the lip, traversed the hard palate, came to the surface above the right ala nasi, passed before the right eye, bruised the upper lid very lightly, and just nicked the right eye-brow. He had received the wound about three months before I saw him. The sight had been completely lost, but had gradually recovered. The left eye had not been affected in any way. On examination, his right vision was 6/24; and externally the eye was normal. Dilating the pupil and examining the fundus, I found he had three shining pieces of metal in his vitreous; and a large healed scar in the lower part of the sclerotic, beside the remains of retinal hæmorrhages. The presence of the metal was confirmed by *X*-rays, which also revealed several small pieces embedded in the neighbouring subcutaneous tissues. There was no response to the giant magnet, so I expect the metal was either tin or nickel from the coating of a bullet or perhaps lead. The eye was quiet, and, although the injury was three months old, the pieces of metal were very bright, showing that there was no chemical action going on. I advised him to leave matters alone, but to seek advice immediately should he experience any discomfort.

Remarks.

The moral of these two cases is too obvious to need labouring. It is quite impossible to see much in an eye recently injured in these ways, but the cases should certainly be watched. I wish to emphasize a point in the first case. Sympathetic ophthalmitis, beyond all shadow of doubt, developed in the second eye without any preliminary signs of irritation or inflammation in the exciting eye, which was absolutely quiet to all outward appearances.

CLINICAL MEMORANDA.

THREE CASES OF RUPTURE OF THE CHOROID BY CONCUSSION.

BY

H. H. TAYLOR, F.R.C.S.,

HOVE, SUSSEX.

THE following are good instances of rupture of the choroid by concussion :—

Case I.—Was struck just below the left inner canthus by a piece of shell. There is a large opening exposing the details of the interior of the nose. The lower lid is everted by the contraction of the wound. There is a transverse rupture of the choroid just below the disc. At first patient could count fingers, but some months after the injury, he had only P.L. The X-rays failed to show any fracture of the orbit or any foreign body in or near the globe.

Case II.—A bullet passed just in front of the left ear, on a level with the tragus and passed out behind, carrying almost the whole of the mastoid process with it. There was facial paralysis. The X-rays showed no injury to the orbit or foreign body near the globe. There were three vertical ruptures of the choroid parallel to each other on the outer side. Could count fingers.

Case III.—This was a rather curious case. Several small pieces of metal struck the right side of the face. One very small piece of metal was seen in the outer wall of the orbit. No fragment of metal could be seen by X-rays in the orbit or in the eye, but there was a large rupture of the outer side of the choroid. The man could count fingers. It seemed hardly possible that so small a piece of metal, without striking the globe itself, could have caused sufficient concussion to rupture the choroid.

A CATARACT OPERATION.

BY

M. CORRY, M.D.,

MAJOR I.M.S. ; CHIEF MEDICAL OFFICER, DELHI PROVINCE, INDIA.

I SHALL be obliged if you will kindly insert in your columns a preliminary note on the following cataract operation, which is now being performed in Delhi.

This operation, which embodies several new features, was conceived and perfected by my assistant, Pundit Hari Shanker. The essential feature of the operation is a preliminary conjunctival flap cut so as not to hamper the movements of the knife in making the incision in the eyeball.

The lens is removed entire in its capsule either with or without a preliminary iridectomy.

The advantages of the operation, as shown by the results obtained in some fifteen hundred cases performed this year, are :—

(1). The wound in the eyeball is closed at once by the flap, so that the risk of subsequent infection is *nil*.

(2). Prolapse of the iris and vitreous are prevented from occurring.

(3). The flap is firmly adherent to the globe within a few hours, and in a large majority of cases the dressing can safely be then removed.

(4). Cataract cases are now treated in this Hospital as out-patients, and they can go home immediately after operation, returning next day to have the dressing removed permanently.

(5). No photophobia is present subsequent to the operation, even on the second day, when the patients are provided with glasses and can see well.

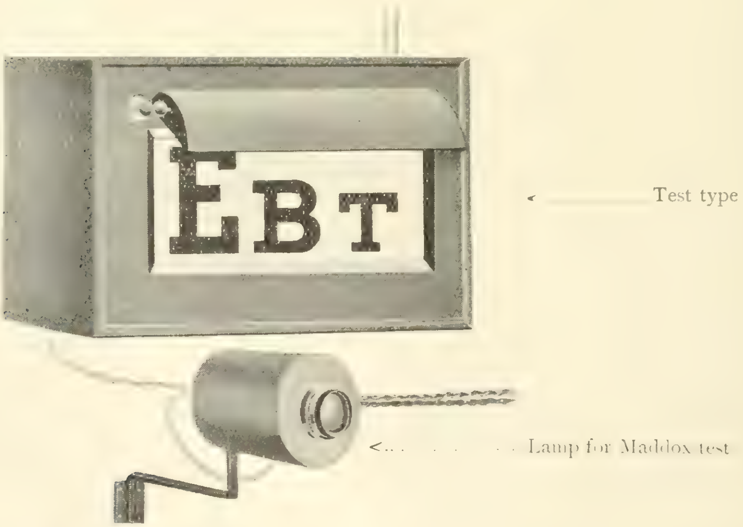
(6). The usual corneal astigmatism is very much less than is generally found after other operations.

NOVELTIES.

A FIXATION LAMP FOR THE MADDOX TEST.

BY
ROBERT HENRY ELLIOT, M.D., F.R.C.S.,
LT.-COL. I.M.S. RETIRED,
LONDON, ENGLAND.

IN using the Maddox rod test, one frequently meets with the difficulty that the patient complains he cannot continuously see the red line. Even very intelligent people may give one considerable trouble by their inability to "keep in touch" with this line. If the surgeon will try the test for himself, he will speedily discover the cause of the difficulty. A light which is bright enough to give a sharply-defined red line of light, is so bright as to dazzle the open eye; whilst a light, which is dim enough to leave the open eye undazzled, does not give a well-defined red line, but one which comes and goes in an erratic fashion. The difficulty can be got over by placing in front of one eye (say the right) a deep neutral-tint glass, whilst the rod is placed before the opposite (left) eye. In order to carry out the



Maddox test without moving the patient from the chair in which his refraction has been tested subjectively, I have had a small piece of apparatus made by Messrs. Spiller, of London, W., and placed immediately beneath the test-types. By means of a 3-way switch the light can be turned either on to the types, or on to the lamp in question from the surgeon's position as he sits at his trial case. The retinoscopy finished, and the suitable glasses fitted in the trial frame, the examination for heterophoria follows with a minimum of inconvenience to the surgeon or patient.

The following description of the lamp has been kindly furnished me by Messrs. Spiller :—

"This apparatus consists of a metal cylinder having an aperture at one end fitted with an iris diaphragm.

The back end of the cylinder has a plate bored to take a standard lamp holder which, in its turn, holds the bracket for fixing to the wall ; the holder and bracket being clamped to the plate by means of an ordinary shade carrier ring. The whole is then secured by means of bayonet catches to the cylinder.

The particular lamp used is an "Axil," its chief feature being that the filament is concentrated at one end, thereby enabling 75 per cent. of the light to be projected in one direction.

Between the lamp and iris diaphragm a very thin frosted disc is interposed, and again in front of the diaphragm a convex condensing lens of short focal length is placed, so that its principle focus is coincident with the glass disc.

The disc of light presented to the eye is consequently of even intensity, whilst the diameter of the disc can be regulated at will by means of the iris diaphragm. A bright line of red light is seen through the Maddox rod, whilst the effect of the neutral-tint glass in front of the opposite eye, is to do away with all tendency to dazzling."

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—PHYSIOLOGY.

Part II.)

(1) **Gutman, A.**—Researches upon the orbital motility of the globe in high grade anomalies of refraction and in increased intra-ocular pressure. (Untersuchungen über orbitale Verschieblichrist des Bulbus bei hochgradigen Refraktionsanomalien und intraocularer Druchsteigerung.) *Zeitschrift für Augenheilkunde*, April and May, 1914.

(2) **Cords, R.**—Remarks upon the examination of the power of estimating depth (perspective). The value of parallactic movements to the one-eyed. (Bemerkungen zur Untersuchung des Tifen schätzungs vermögens.) *Zeitschrift für Augenheilkunde*, July, 1914.

(3) **Harman, N. Bishop.**—The appearance of pigment in the eye of the child. *Transactions Ophthalmological Society U.K.*, 1914.

(4) **Edridge-Green, F. W.**—**The external fovea and its relation to the theory of vision.** *Transactions Ophthalmological Society U.K.*, Vol. XXXIV, 1914.

(5) **Edridge-Green, F. W.**—**The theory of vision.** *Ophthalmic Review*, September, 1914.

(6) **Noiszewski, Casimir.**—**The cortical visual centre.** (**Le centre visuel cortical.**) *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(1) **Gutmann**, of Berlin, has already published a paper in the *Zeitschrift* (February, 1914) upon the motility of the normal eyeball in the orbit in an antero-posterior direction. He used an instrument, somewhat similar to the Schiötz tonometer, an appliance which appears to the reviewer to be liable to grave errors. He now gives us the result of a second series of observations upon abnormal eyes, highly myopic, highly hypermetropic, and glaucomatous. The results he obtained are those which we should have anticipated; the hypermetropic eye being small and the orbit, on the contrary, generally of normal capacity, the motility of such a globe in an antero-posterior sense is greater than the normal. The myopic eye is elongated and more nearly fills the orbit. Its motility is accordingly less than that of the emmetropic organ. A glaucomatous eye is less easily moved back into the orbit than one with normal tension. T. HARRISON BUTLER.

(2) **Cords**, after investigating the value of movements of the head to the one-eyed when tested for the faculty of estimating distance, comes to the following conclusions:—

1. Parallactic movements are of more value in estimating distance in the case of those who have been one-eyed for over a year than they are to a two-eyed individual with one eye bandaged.
2. Other things being equal, their worst estimates are better and their judgments prompter.
3. The best and quickest answers are given by those who have been one-eyed from early youth.
4. There are, however, some who have been one-eyed for more than a year who make worse records than a two-eyed person with one eye tied up.
5. There are men who can judge distance better with one eye bandaged than the average of persons who have lost an eye for more than a year.

T. HARRISON BUTLER.

(3) **Harman**, of London, reminds us that, while it is common knowledge that the child in the white races is born with light irides, the transition which takes place from the infantile to the later appearances is a matter of uncertainty both as to time and manner. The known facts are, that the irides at birth have a pecular slatey-blue colour, and that this gives place later to the various shades of blue, grey, hazel, and brown.

After finding that even the most intelligent parents were unable to say when and how the change takes place, Harman set himself to make direct observations on the children of one pair of parents. The children were four in number, and were each examined every week for the first six months, and after that once a month. Details of the changes observed in each case are given. We may, perhaps, be content to give the conclusions arrived at: "In white children the iris stroma begins to clear from the third to the sixth week of life." (In one of his observations the author describes this *clearing* as being suggestive of the clearing of a muddy deposit from a fine carving, a description which will appeal to those who have had occasion to examine with a magnifier the eye of the new-born child). "Brown pigment has been noticed on the surface of the iris as early as the sixth week. The pigment appears in patches, and first in the basal zone, and the growth is earlier, and therefore more marked at any point of time in the temporal half of the iris. A later pigmentation may appear in blue irides during the second year and later; this begins in the pupillary border, and is characteristic of the dirty-blue iris, the greenish iris, and many hazel irides." ERNEST THOMSON.

(4) The short article by **Edridge-Green,** of London, is partly descriptive of two lantern slides of the external fovea, and partly concerned with the relation of the external fovea to the theory of vision advanced by the author, the theory, namely, that the cones are the terminal percipient elements, and that vision takes place through the stimulation of the cones by the photo-chemical decomposition of the liquid round them sensitised by the visual purple: the rods being concerned with the formation and distribution of the visual purple. ERNEST THOMSON.

(5) In this paper, **Edridge-Green,** of London, states his theory as follows.—The cones are the terminal perceptive visual organs; the rods are not perceptive organs, but are concerned with the formation and distribution of the visual purple. Vision takes place by stimulation of the cones through the photo-chemical decomposition of the liquid surrounding them, which is sensitised by the visual purple. He then deals with some of the objections lodged against this view, and considers "certain facts which are a necessary consequence of the theory and are untenable on any other hypothesis." The paper should be read in the original. A. H. PAYAN DAWNAY.

(6) The following seems to express the gist of **Noiszewski's** paper.

If we consider what happens when we fix an object, we see that the surface on which a clear image can be formed, *i.e.*, the plane surface at right angles to the visual axis, is of very small dimensions, and, since every object in space is made up of an infinite number of points, we cannot "project" the object in its entirety without displacing the visual axis. Thus, a large series of points is received consecutively on the same retinal point; but in the visual cortex these points are projected in different planes according to the directions of the lines of fixation. Thus, if we think of the visual line as having one extremity on the object under observation and the other at the visual cortex, then, while the objective end of the visual line traces the details of the object in the field of fixation, the other end of the line traces the representation of the object in the visual cortex. The visual region of the cortex is not merely a reflection of the retina, but consists of a multitude of projections of visual fields. The relation between the retinal image of an object and its projection on the visual cortex is likened by the author to that between the patterns of a gown in a fashion journal and a photographic picture of the gown. The lines of the patterns cross in all directions and look to a novice like a senseless jumble, but the practised eye of the dressmaker selects the outline she requires. The eye passes from point to point, tracing an outline made up of a series of consecutive fixation points which represent the pattern as a whole. The difference between the retinal image and its projection on the cortex lies in the fact that the visual cortex brings about a synthesis of retinal sensations with motor acts, so that lesions of the cortex cause mind-blindness and optic ataxy. This region of the cortex possesses psychomotor and association cells, but the presence of sensory cells has not yet been demonstrated. On the contrary, it is known that the cortical substance in itself is blind and deaf. A. J. BALLANTYNE.

II.—SYMPATHETIC DISEASE.

(1) Weekers.—Sympathetic amblyopia. (Amblyopie sympathique.) *Société Belge d'Ophtalmologie*, 28 avril, 1912.

(2) Coppez, J.—Sympathetic ophthalmia. (Ophtalmie sympathique.) *Société Belge d'Ophtalmologie*, 28 avril, 1912.

(3) Brock, W.—Clinical observations on idiopathic irido-cyclitis and sympathetic ophthalmia. (Klinische Beobachtungen über idiopathische Irido-cyklitis und sympathische Ophthalmie.) *Arch. f. Ophthal.*, November, 1913, p. 371.

(4) Jompolsky, Fanny.—Sympathetic ophthalmia after enucleation. (Sympathische Ophthalmie nach der Enukleation.) *Zeitschrift für Augenheilkunde*, Vol. XXXII, p. 233.

(5) Meller, J.—The question of spontaneous sympathising inflammation. (Translated by George M. Waldeck.) *Annals of Ophthalmology*, April, 1915.

(1) **Weekers**, of Liége, believes that we too often designate under the name "sympathetic amblyopia" affections of the eye characterised by a ryhthmic and periodic or permanent interruption of sight, a contraction of the visual field, dazzling, photophobia, phosphènes, pain, and paresis or spasm of the accommodation in patients whose other eye has been injured. In support of his views, Weekers cited four observations. He believes that the disturbances were due to a neurosis in which the ocular troubles were predominant. This condition he proposed to call "Pseudo-sympathetic ocular neurosis."

The lesions, Weekers thinks, are not under the direct or immediate dependence of the wounded eye, but due to neuropathic symptoms betraying a mental disorder set up by the uneasiness of the patient or by the disturbances of sight which might lead to loss of an eye. MARCEL DANIS.

(2) **J. Coppez**, of Brussels, exhibited a female affected with sympathetic ophthalmia, who had been cured by the extraction of a foreign body which had remained for seven weeks in the wounded eye. MARCEL DANIS.

(3) **Brock**, of Stuttgart, begins his article by quoting the hypothesis which forms the basis for Elschnig's theory, *viz.*, that sympathetic ophthalmia occurs through hypersensibility of the uveal tract from antigen absorption of uveal tissue from the injured eye. Reis has called attention, from a pathological standpoint, to the difficulties which stand in the way of accepting this theory. In searching for the cause of sympathetic ophthalmia, and the so-called idiopathic irido-cyclitis or iritis, Elschnig, on the ground of his clinical and pathological examinations, comes to the following conclusions: that there is no distinction to be made between idiopathic and sympathetic iritis, as regards either the involvement, the cause, or the end-result, for non-traumatic iritis occurs frequently in both eyes. Considering Elschnig's as well as Schnabel's material, chronic inflammatory or creeping iritis, in the great majority of cases, leads to a similar disease of the second eye, or this follows after a longer or shorter time. The prognosis of the spontaneous or idiopathic iritis, seems not so favourable as one would have expected from a comparison of the behaviour of the sympathetic and spontaneous irido-cyclitis. Finally, sympathetic ophthalmia is not such

a severe disease as was formerly thought. Schirmer obtained a certain cure in fourteen per cent., and Gifford had still better results to report, so that the result of sympathetic ophthalmia in 29 per cent. of Elschnig's cases of idiopathic double iritis, is not specially remarkable. Brock then refers to E. von Hippel's opinion of Elschnig's theory. Does there not occur just as often in other clinics, indican in the urine, and is it not present in other diseases of the eye? Further, should there be attached the importance to indican secretion which Elschnig attributes to it? von Hippel allowed his material to be examined as regards the question of indol, and came to the conclusion that there was an increased indol content in the large bowel to the same degree in other eye diseases as in idiopathic iridocyclitis. Bernheimer found, in his experience, that increased indican contents in the bowel did not occur any oftener in iridocyclitis than in retrobulbar neuritis, senile cataract, and other eye diseases of similar degree. von Hippel answers the second question by stating that, according to the researches of well-known men, indican in the urine is a physiological condition. Brock wishes to take the following stand.—(1) In agreement with Reis, we also have a series of observations where a sympathetic inflammation could not have been prevented in healthy, lively children, who because of their liveliness received the eye injury. (2) Further, our experience has been that the course of the first attack forms a criterion for the future course of the disease. If the first attack of sympathetic ophthalmia recovers with a certain amount of vision, so in later attacks there does not follow any remarkable diminution of vision, while in spontaneous iridocyclitis, the first attack very seldom ends in blindness, whereas the later attacks very often do. Brock goes on to compare the material of the Munich and Prague clinics, and concludes that his clinical statistics differentiate remarkably the so-called idiopathic iridocyclitis and sympathetic ophthalmia in regard to its double sidedness, prognosis, and result, so that from his experience, the clinical picture is against accepting Elschnig's hypothesis as to the origin of sympathetic ophthalmia.
HANFORD MCKEE.

(4) **Jompolsky,** of Vienna, gives a clinical history of eight cases in which sympathetic ophthalmitis developed after the exciting eye had been removed. These patients were all treated in Fuchs' Clinic, and the pathological investigations will shortly be published by Meller.

The essential details can be gathered from the following table:

No.	Age in years.	Nature of Injury.	Time between the injury and enucleation.	Time between enucleation and onset of sympathetic ophthalmia.	Result.
1	7	Glass splinter	18 days	12	fingers
2	16	Iron splinter	30 ,,	28	,,
3	36	Glass injury	63 ,,	8	?
4	18	Fragment of lead	[illegible] ,,	38	6/5 ?
5	16	Knife wound	27 ,,	4	6/6
6	40	Iron splinter	39 ,,	3	6/6
7	7	Needle puncture	30 ,,	10	good
8		Wound from cow's horn	37 ,,	4	fingers

It will be noted that the prognosis is good in such cases, since 60 per cent. recovered with good vision.

At least 65 further cases have been reported, most of them by the Committee on Sympathetic Ophthalmia of the Ophthalmological Society of the United Kingdom. There are at least five reports of the outbreak of the disease in the remaining eye a year or more after the enucleation. The exact periods are: 1 year, 1 year, 15 years, 10 years, and 21 years. The authoress very properly criticizes these cases, and doubts whether the disease was sympathetic in nature. The fact that one eye has been removed does not render the fellow immune to ordinary cyclitis.

The reviewer has published a case in which sympathetic disease developed 14 days after an eye which contained a piece of coal had been removed. After nine months' treatment, an acuity of 6/9 was attained. He has under treatment a case in which severe cyclitis has developed nine years after an eye had been removed on account of perforating injury. This condition might have been regarded as one of sympathetic ophthalmitis. But the blood count is normal, and a general reaction followed an injection of tuberculin. The disease is probably tuberculous in nature.

A study of the recorded cases would seem to indicate that no eye can be considered safe until two months have elapsed after the enucleation.

T. HARRISON BUTLER.

(5) **Meller**, of Vienna, in the present communication, gives in great detail the notes, both clinical and pathological, of two cases of chronic endogenous uveitis, which closely resemble cases of sympathetic ophthalmia. He refers to Fuchs' paper on the subject, and especially to Fuchs' fourth group of cases of chronic endogenous uveitis, to which those now under discussion belong. He returns again to his contention that the view that in all cases of sympathising ophthalmitis the affection of the first eye must be exogenous is wrong. We must also rid ourselves, according to Meller, of the notion that sympathetic infection travels from the first eye to the second, either by way of the optic tracts, or by the vascular or lymph systems. The noxa of the disease exist throughout the body. By remaining in the eye, in which damage to the uvea has first prepared the way, either the virus increases in intensity, or the uvea of the second eye becomes sensitised to its action. The symphathising eye now also becomes diseased by means of the noxa *with which it was invaded simultaneously with the attack on the first eye.* The noxa present in the second eye could only incite an inflammation by virtue of the disease in the other eye. The indication for early removal of the first eye, therefore, stands like a rock, whilst the theories which explain the reason for our action, change like waves which wash its base. It is impossible in an abstract to do justice to Meller's communication. Those who are interested in the clinical and pathological details must read them in the original. All that can be done here is to record the conclusions to which the work has led up.

R. H. ELLIOT.

III.—PATHOLOGY.

(*Fourth Notice.*)

(1) **Terlinck.—A case of palpebral mycosis. (Un cas de mycose palpébrale.)** *XVI Congrès Flamand des Sciences Naturelles et Médicales.*

(2) McBurney, Malcolm.—The absence of cicatrisation in the iris after operation or injury. *Arch. of Ophthalmology*, January, 1911.

(3) Leplat.—Metastatic carcinoma of the eye. (Carcinome métastatique de l'œil.) *Ann. d'Oculistique*, octobre, 1911.

(4) Akatsuka, T.—An unusual case of sarcoma of the ciliary body. (Ueber einen eigentümlichen Fall von Ziliarkörpersarkom.) *Klin. Monatsbl. f. Augenheilkunde*, December, 1912.

(5) Tooke, Frederick.—Calcareous degeneration of the cornea and lens capsule. *Archives of Ophthalmology*, January, 1913.

(6) Rados.—On conjunctival plasmomata. (Ueber Plasmome der Bindehaut.) *Zeitschrift für Augenheilkunde*, February, 1913.

(7) Hajano.—A contribution to the knowledge of retinitis exudativa. (Ein Beitrag zur Kenntnis der Retinitis exudativa.) v. Graefe's *Archiv f. Ophthal.*, Vol. LXXXIV, 1913, Part i, p. 30.

(8) Eicke, Joh.—A perithelioma of the lid. (Ein Peritheliom des Lides.) *Klin. Monatsbl. f. Augenheilkunde*, May, 1913.

(9) Duclos.—Cylindroma of the lower eyelid. (Nascent type of cylindroma. [Cylindrome de la paupière inférieure (Type naissant du cylindrome).] *Ann. d'Oculistique*, juin, 1913.

(10) Dimmer, F.—A case of fungus disease of the eye. (Ein Fall von Schimmelpilzerkrankung des Auges.) *Klin. Monatsbl. f. Augenheilkunde*, August, 1913.

(11) Laven, Ludwig.—A contribution to our knowledge of primary sarcoma of the iris. (Beitrag zur Kenntnis der primären Irissarkome.) *Klin. Monatsbl. f. Augenheilkunde*, October-November, 1913.

(12) Orr, W. F.—A clinical contribution to the pathology of glaucoma. *Ophthalmic Review*, February, 1914.

(13) Brown, E. V. L.—Anatomical study of a case of temporal coloboma in an hyperopic eye. *Arch. of Ophthalmology*, May, 1914.

(14) Wright, Hal R.—A new method of preparing an eye for microscopic sections. *Ophthalmic Record*, May, 1914.

(15) Schoenberg, M. J.—A contribution to the experimental study of ocular anaphylaxis. *Ophthalmology*, October, 1914.

(16) Crigler, L. W.—Epibulbar sarcoma, with microscopic and macroscopic sections. *Arch of Ophthalmology*, Vol. XLIV, No. 1, January, 1915.

(17) Cirincione, Speciale.—A study of so-called aniridia, its anatomy and pathogenesis. [Contributo alla anatomia e patogenesi della cosidetta aniridia (vizio di sviluppo dell'iride).] *La Clinica Oculistica*, Gennaio, 1915.

(18) Alt, Adolf.—Further observations on tumour-like hyperplasia of the palisade cells of the pars ciliaris retinæ. *American Journal of Ophthalmology*, January, 1915 (accidentally printed 1914 on page 1).

(19) **Greeff, R.—A method of preserving macroscopic eye specimens in their natural colours.** *Arch. f. Augenheilkunde*, Vol. LXXVI, 1914, and *Arch. of Ophth.*, Vol. XLIV, No. 2, March, 1915.

(20) **Alt, Adolf.—An intra-ocular angiomatous spindle-cell sarcoma with bone formation. Probable aplasia of the optic nerve.** *American Journal of Ophthalmology*, March, 1915.

(21) **Maxted, G.—A case of lacrymal concretions.** *British Medical Journal*, May 15th, 1915.

(22) **Walker, Cyril H.—Glioma of the retina with hypopyon-like deposit in the anterior chamber.** *Trans. Ophthal. Society U.K.*, Vol. XXXV, 1915, p. 363.

(1) The microscopical examination of this case by **Terlinck**, of Brussels, demonstrated the existence of aspergillus fumigatus. MARCEL DANIS.

(2) **McBurney**, of New York, gives the results of an anatomical examination of eight eyes, made in Fuchs' clinic. He finds that a cut iris surface shows little or no change so long as sepsis is avoided. He quotes Fuchs' communication on the subject in 1896, but makes no reference to Thomson Henderson's work. R. H. ELLIOT.

(3) **Leplat**, of Liège, records a case of a woman, aged 39 years, who consulted him on October 14th, 1910, for redness in the left eye which had been noticed for several days previously. On examination, he found a gray tumour in the ciliary region downwards and outwards pushing the iris forwards and accompanied by vascularisation in the inner corneal angle and ciliary injection in the corresponding part of the eye. The vision was 5/5. The vitreous was clear and the optic disc normal, but there was a diffuse gray-patch near the posterior pole of the eye. As there was a history that the patient had had an operation for carcinoma of the breast a year previously, the case was diagnosed as one of metastatic carcinoma.

The eye was removed on November 17th, 1910, and microscopic examination showed that there was a tumour of the lower-inner part of the ciliary body which spread in a layer in the choroid and supra-choroidal space to the posterior pole, where it formed several nodules. The temporal part of the choroid and ciliary body was normal.

The patient subsequently lost the sight of her right eye from optic neuritis with retinal hæmorrhages, and she died in May, 1911, from cerebral metastases.

The case is of interest since carcinoma of the uveal tract is a very rare condition, and the author has been able to find only thirty-seven cases on record. R. J. COULTER.

(4) **Akatsuka's** patient presented a brownish tumour, which projected through the pupil into the anterior chamber, partly concealing the iris by lying on its anterior surface at the nasal side. Its surface was convoluted, like that of the cerebrum. Judging by its appearance and by its position, the author concluded that it was a tumour growing from the retinal epithelial layer of the iris or ciliary body. After enucleation, it was found to be a sarcoma growing from the ciliary body at the temporal side, passing between iris and lens, and projecting through the pupil into the anterior chamber, and lying in front of the iris on the nasal side. It was covered with epithelium continuous with that of the ciliary body. On the side from which it had originated it infiltrated the iris and corneo-sclera. The author considers such a sarcoma of the ciliary body unique. A. J. BALLANTYNE.

(5) A strong vigorous man, healthy in all particulars save the injured eye, consulted **Tooke,** of Montreal. Apparently he had had a superficial ulcer of the cornea, produced traumatically, and followed by gradual loss of the eyesight. Special advice was not sought until recurring attacks of pain and inflammation made this necessary. A round dense scar was then observed in the centre of the cornea, over which the epithelium was intact. There was slight circumcorneal injection, the tension was raised, and there was no perception of light. The eye was enucleated and it was then found, upon examination, that there was a calcareous deposit beneath the corneal epithelium, but as this was not anticipated clinically, chemical tests were not attempted with the fresh tissues, and subsequent treatment of the sections when imbedded was only partly satisfactory. Under the microscope, treatment of the sections with sulphuric acid produced a distinct effervescence. The capsule of the lens was also found to be calcareous, breaking like an egg-shell and allowing a degenerated cortex to escape of very much the same consistence as egg albumin. The root of the iris was in apposition to Descemet's membrane, but there were no synechiæ and no exudate in the anterior chamber, although the iris was in a condition of chronic inflammation. The lens condition Tooke considers to be a primary degenerative process.

(6) **Rados,** of Budapest, cites the literature of the subject and then describes two cases. Microphotographs of the tumours are to be found in the text. T. HARRISON BUTLER.

(7) **Hajano,** of Tokio, had a little boy, aged two years, brought to him because the father had noticed for about six months that the child's right eye presented a curious reflection in lamp light. The cornea was slightly cloudy, the anterior chamber was shallow, and close behind the lens were three yellowish-white prominences, covered with tortuous vessels and hæmorrhages. The *status glaumatosus* was present. The condition was diagnosed as one of glioma. But the pathological failed to confirm the clinical diagnosis. There was complete detachment of the thickened and folded retina, the deeper layers of which showed changes believed to be those of retinitis exudativa.

SYDNEY STEPHENSON.

(8) **Eicke,** of Breslau, reports a case of this unusual condition. The tumour had been in existence for two years, and had grown very slowly. It formed a mass, the size of a pea, in the upper lid, being freely movable on the neighbouring tissues. Microscopically, it was found to be enclosed in a capsule. The tumour cells were grouped round the smaller blood-vessels. The central part of the tumour showed myxomatous degeneration.

A. J. BALLANTYNE.

(9) **Duclos,** of Paris, describes the histological appearances found in a tumour removed from the ciliary border of the lower lid of a man, aged 39 years. The growth was of four years' duration, and commenced as a prominence, the size of a pin head. A year later, two other similar masses had developed near the first, and eighteen months later, these three smooth rounded excrescences had joined to form a tumour 10 mm. by 6 mm. with a nodular surface, situated 5 mm. from the punctum lacrymale. Four months after the operation, there was only a scar to be seen at the seat of the tumour, but three months later, the ciliary border and neighbouring conjunctiva were raised by a suspicious flat greyish mass, 3 mm. or 4 mm. in diameter, surrounded by a hyperæmic zone. Microscopic examination showed that the tumour consisted of masses of atypical epithelium permeated by bands of an amorphous substance with a rather scanty tissue framework. In sections coloured by thionine, the amorphous

substance took the reddish-violet colour characteristic of mucus, while a clear substance, which was found running along the cellular bands of connective tissue, took a lighter shade of the same colour. The whole specimen was thus permeated by bands of connective tissue mostly having undergone mucous degeneration. In certain parts of the tumour it could be seen that its histogenetic organisation consisted of a vascular axis accompanied by a certain amount of mucous connective tissue surrounded by a dense mass of epithelial cells at the margin of which there appeared among the cellular elements clear spaces filled with mucous tissue, the whole of which had a lobulated appearance, and was more or less surrounded by a zone of connective tissue. In other parts of the tumour there were indications that in certain places the connective tissue had undergone degeneration, partly hyaline and partly mucoid. The author records the case as one of nascent cylindroma corresponding to the definition of this class of tumour recently given by Letulle as a mixed dysembryoplasic tumour in which connective tissue which has remained in a mucous state from the commencement is associated with atypical epithelial formations. The paper is illustrated with four very striking coloured reproductions of microscopic photographs.

R. J. COULTER.

(10) The case reported by **Dimmer**, of Vienna, presented clinically several protrusions of the sclera on the temporal side of the globe, ciliary injection, fulness of the episcleral vessels, slight dulness of the cornea, shallowness of the anterior chamber, discoloration of the iris, narrowing and distortion of the pupil, and tenderness on pressure. No fundus details were distinguishable, and vision was 2/60. Later, exophthalmos and chemosis developed. Then some yellow points appeared near the limbus, from which pus exuded. The eye was enucleated.

The affected region of the sclera was found in sections to present cellular infiltration, combined with the presence of hollow branching mycelium threads, with terminal knobs. This growth was chiefly found in the inner layers of the sclera. Besides the main focus, which was responsible for the clinical picture, foci of cellular infiltration and of fungus growth were found elsewhere, not only in the sclera, but in the choroid also. Inflammatory changes were present in the iris, ciliary body, and optic nerve.

The author believes that the infective agent reached the sclera *via* the choroid, by way of the blood-stream. Whether it gained the blood as the result of an injury or not, is undetermined. The nature of the fungus is also uncertain.

A. J. BALLANTYNE.

(11) **Laven**, of Kiel, records the case of a girl who was known for years to have a pigmented nævus of the iris, which showed no sign of growth. During 1912 it commenced to grow larger, and soon filled a third of the anterior chamber and gave rise to marked elevation of tension. The eye was enucleated. The tumour was found to be replacing the normal iris tissue, and was full of pigment and vacuoles. A narrow strand of tumour cells could be traced round the root of the iris, and Schlemm's canal and the neighbouring vessels were filled with tumour cells. Pigmented cells could also be found in the small vessels in the episcleral tissue near the limbus.

Ribbert has expressed the view that all sarcomata of the uveal tract, whether pigmented or not, are derived from the chromatophores, and that they pass through the three stages of: (1) young round cells without pigment, (2) spindle cells without pigment, and (3) spindle cells with pigment. The author, in the light of this classification, places his case in the second and third stages. Eighteen months after the commencement of increased growth, he is able to report the absence of either local recurrence or

general metastases. The general topic of sarcomata of the iris is discussed.
A. J. BALLANTYNE.

(12) **Orr**, of Melbourne, heads this paper with the statement of von Graefe that "the essence of glaucoma lies in the increase in the intra-ocular pressure from which all the other essential symptoms of glaucoma can be deduced." After recording the results of numerous observations as to the reliability of Schiötz's tonometer, he comes to the conclusion that it is useful for noting rises and variations of tension, but errors up to 10 mm. of Hg. may have to be allowed for in results. By careful analysis of cases, he endeavours to show that glaucoma is not dependent upon intra-ocular pressure *per se*, and that the changes which occur are bio-chemical in origin and not bio-physical. This is further supported by the fact that the aqueous in inflammatory, and in some cases of chronic, glaucoma shows an increase of albuminous content. From this point of view, the use of eserine probably promotes an onflow of the toxic lymph, while iridectomy and operations to produce filtration scars probably also produce effects on the nutrition of the eye.
A. H. PAYAN DAWNAY.

(13) **Brown,** of Chicago, studied the above-noted condition on an eye provided by Fuchs. He found a crescentic defect in the pigment epithelium, choroid, and inner layers of the sclera along the temporal border of the disc. The defect was filled by a fold of the retina, which comprised a direct continuation of the two nuclear layers. The nerve fibres passed directly over into the nerve-head in the usual way. The sclera was nowhere ectatic. He adopts Elsching's theory of excessive proliferation of the margins of the secondary optic vesicle, and subsequent interference with the development of choroid, sclera, and sheaths, as the best explanation of cases of atypical colobomata, but confesses his inability to explain why the excessive proliferation occurs.
R. H. ELLIOT.

(14) **Wright,** of Columbus, describes and figures a method of fixing of eyes whereby intra-ocular pressure is maintained, and the tissues fixed in their normal positions, so preventing detachment of the retina and shrivelling or wrinkling of the cornea.

Briefly, the eye is suspended in a vessel containing the fixing solution and connected with another inverted vessel at a higher level, and containing similar solution by means of a rubber tube and pipettes, which pass through an opening made in the sclerotic into the vitreous chamber.
J. JAMESON EVANS.

(15) **Schoenberg,** of New York, opens his paper with an account of the history of the subject of anaphylaxis, defines the term, and gives some examples of anaphylactic action. He then deals with the practical applications of the conception of anaphylaxis in explaining idiosyncrasy, serum disease, the Noguchi and Herxheim reactions, the ophthalmo-reactions for typhoid and tubercle, and many other conditions. Among the eye affections an explanation of which has been attempted on an anaphylactic basis, he mentions sympathetic ophthalmia, interstitial keratitis, and phlyctenular keratitis. Perhaps one of the most suggestive lines of enquiry is that relating to the possibility of auto-anaphylaxis. As the author expresses it "There are pathologic conditions (trauma, intoxications, infectious diseases, tumours, chronic inflammations, etc.) in which there is going on a more or less continuous resorption of degenerated and dead tissues. The passage into the general circulation of such material equals, under certain circumstances, a parenteral introduction into the body of a foreign albumin, and renders the organism auto-anaphylactic." Again, although homologous serum produces no anaphylactic reaction in the eye,

homologous serum *plus* bacterial extracts produces inflammatory reaction when injected into the eye. It is suggested that this may account for some non-bacterial inflammations occurring after ophthalmic operations or injuries.

Details are given of the author's own experiments, in which rabbits were employed as being less easily sensitised than guinea pigs, and possibly presenting conditions more nearly resembling those found in man. The sites of injection were the subcutaneous tissues, the veins, the cornea, and the anterior chamber, and the materials injected were human serum, chiefly from patients with interstitial keratitis, and Tuberculin B.E. Local reactions in the form of keratitis, iritis, etc., were most frequently produced when the sensitising injection was made into a vein and the consecutive injection into the cornea or anterior chamber. A. J. BALLANTYNE.

(16) **Crigler** reports a case of melanotic epibulbar sarcoma, for which he removed the eyeball. He reviews the bibliography of the subject. Sarcomata situate in the conjunctiva are as malignant as those on any other exposed surface of the body. That they are less fatal he thinks can be explained by the fact that they are noticed early, and that drainage from them can take place only in one direction. He warns the reader against thinking that small pigmented tumours, situate wholly in the conjunctiva, are necessarily sarcomatous, or need such radical treatment as that meted out to the malignant growths. R. H. ELLIOT.

(17) **Cirincione**, of Rome, points out that the retinal part of the iris, *i.e.*, the pigment layer, is normally abundant in aniridia, although not normally situated. The fault of development cannot therefore be attributed to any fault of the pigment layer, but must be due to defect of the stroma, more especially to a defect in the development of the iris vessels. This occurs in the fourth month of fœtal life.

The paper contains a very full and clear account of three cases of this rare abnormality. HAROLD GRIMSDALE.

(18) The pathological article by **Alt**, of St. Louis, is not suitable for abstract.

(19) **Greeff**, of Berlin, reviews the various methods that have been brought forward with a view to the preservation of macroscopic eye preparations in their natural colours, and discusses the weak points of each in turn.

He claims now to have found, thanks to the work of his laboratory servant, a satisfactory method at last. — The eyeball is hardened from twelve to twenty-four hours in 5 per cent. formalin solution; it is then divided and placed in alcohol. The formalin causes the loss of a certain amount of the colouring matter, but if the eye is kept in this solution not longer than twenty-four hours, the colour is re-obtained when the specimen is placed in alcohol. The strengths of alcohol used are as follows:— 70 per cent. for ten minutes, 80 per cent. for the same period, 96 per cent. for half-an-hour; finally, the specimen is placed in Pick's preserving fluid, which consists of distilled water, 500 parts; sodium acetate, 150 parts; and glycerine, 250 parts. Before placing it in this solution, the specimen should be glued fast in a suitable jar. The back surface of the eyeball is placed for a few minutes in distilled water. This is the surface of attachment. It is then carefully dried. A little eating gelatine is dissolved in a glass and the specimen is glued by means of this to the glass wall, or to a milk glass plate, on which the eyeball is to rest. The specimen is ready to mount in a minute or two; the vessel is then filled with the preserving fluid, and the margin of the glass and the top are stuck together with the adhesive mixture, no air being admitted. R. H. ELLIOT.

(20) The pathological specimen reported on by **Alt**, of St. Louis, was a blind painful eye removed from an idiotic girl of 27 years, whose other eye had already been removed. No case-history was available. It is not even known why the other eye had previously been removed. S. E.

(21) **Maxted**, of Norwich, removed a number of fawn-coloured concretions from the canaliculi of the eye of a woman, aged 68 years. Bacteriological examination of the concretions (by G. P. C. Claridge) showed that they were made up of masses of organisms somewhat resembling colonies of actinomyces, staining very imperfectly by methylene blue or Gram, and manifesting in places false branching. SYDNEY STEPHENSON.

(22) In a lad, aged four years, **Walker**, of Clifton, Bristol, observed a deposit of snuff-coloured material, which occupied about one-quarter of the anterior chamber, and which could be made to shift its position slowly by turning the child's head in various directions. No redness of the eye. Cornea clear. With the ophthalmoscope, a dull-brown reflex could be obtained from the fundus of the eye, which possessed doubtful perception of light. The eyeball, which had meanwhile become somewhat inflamed and painful, with slight rise in tension, was eventually enucleated. About three weeks later, in consequence of the pathological report that the optic nerve was invaded, some three-quarters of an inch of the optic nerve was removed. A medical report, received about three-and-a-half months after the last intervention, stated that an offensive, bleeding tumour, the size of a large cocoanut, now protruded six or seven inches from the orbit, and had obliterated the right nasal bones and encroached upon the right angle of the mouth.

The moral pointed by Walker's instructive case appears to be the necessity of having pathological work carried out by one versed in ophthalmic pathology. The enucleated eyeball was reported by an eminent pathologist as containing an angiosarcoma. Had it not been for the report of a sub-committee, appointed by the Ophthalmological Society to examine and to report upon the microscopic specimens from the eye, this case might have gone on record as an example of "Angiosarcoma of the retina in a child of four years," a rarity indeed. The growth was reported, however, as an "example of glioma of the usual type." SYDNEY STEPHENSON.

IV.—THE OCULAR COMPLICATIONS OF DISEASES OF THE SKIN.

(1) **Barnett, Matty Lee C.—Erythema multiforme with conjunctival involvement.** *American Journal of Ophthalmology*, May, 1915.

(2) **Cross, F. Richardson.—Eye symptoms in Kaposi's disease, xeroderma pigmentosum.** *Transactions Ophthalmological Society U.K.*, Vol. XXXV, 1915, p. 202.

(3) **Greeves, R. Affleck.—The microscopical anatomy of a conjunctival tumour from a case of Kaposi's disease.** *Ibidem*, p. 213.

(1) In the case reported by **Barnett**, of St. Louis, the lids and conjunctiva were affected in the course of erythema multiforme. No exact description of the ocular lesions is given by the authoress. S. E.

(2) **Cross**, of Clifton, Bristol, has had two cases of Kaposi's disease, occurring in a brother and sister, under his recent observation. The disease began in both children when they were about nine months of age, the first manifestation, as usual, being extensive freckling of the exposed parts of the body. These changes were followed by the appearance of atrophic areas in the skin, nodular or papular cutaneous growths, and, in the case of the girl, by eversion of the edge of the eyelids.

When the lad was four years of age, Sir John Tweedy, who was consulted, found an indolent swelling in the conjunctiva and episclera on the inner side of the left eye, accompanied by photophobia. Improvement followed the scraping away of the growth, and the result seemed to be still satisfactory when the child was seen upwards of six years after the little operation.

When Cross examined the lad, who was then aged 11 years, there was so much photophobia as to necessitate the use of chloroform before the eyes could be fully examined. Two small phlyctenule-like swellings, one at the lower and right margin of each cornea, were found. Some six months later, a superficial opacity, devoid of blood vessels, was observed to run obliquely across the lower third or so of the right cornea, starting from a vascular spot at the lower and outer part of the limbus. The eye was acutely inflamed. The patient again returned some nine months after he was first seen by Cross, and there was then a white growth, the size of a pea, attached to the lower-inner edge of the left cornea and to the neighbouring limbus. It was excised, and its base scraped and cauterised.

The girl, then aged 9½ years, was seen once by Cross. A wide, non-vascular infiltration ran across the right cornea, and there was a ragged erosion of the covering epithelium. The left eye had been red and "weak" for some months.

(3) The tumour removed by Cross from the eye of the lad whose case is described in the foregoing extract, was sent to **Greeves**, of London, for pathological examination and report. The growth (6·5 mm. by 6·5 mm. by 3 mm.) was composed almost wholly of squamous stratified epithelium, most of the cells being prickle cells. No keratinisation. No cell nests. The deeper cells, which were growing actively, were intersected by a few columns of supporting tissue. Degenerative changes pronounced, probably because the blood supply was very poor. In Greeves' opinion, malignancy existed at one particular spot, where isolated strands of epithelial cells could be seen to invade the supporting tissue.

Discussion.

Mackay, of Edinburgh, had seen a case of Kaposi's disease, which, to the best of his recollection, was associated with "something like a commencing phlyctenule on one or both eyes."

Russ Wood, of Shrewsbury, had examined a case of Kaposi's disease in a woman, aged 35 years, who had suffered from the condition since childhood. There was ectropion of the left lower eyelid, and marginal ulceration of the cornea of the phlyctenular type. There were no definite growths,

SYDNEY STEPHENSON.

V.—INJURIES OF THE EYE IN WAR.

(1) **Axenfeld, Th.**—Experiences in war ophthalmology and organisation. (Kriegs-ophthalmologische und organisatorische Erfahrungen *Deutsche med. Wochenschrift*, September 24th, 1914, and *Centralbl. f. prak. Augenheilkunde*, November-December, 1914.

(2) **Cosmettatos, G. F.**—Wounds of the eyes by hand grenades employed in war. (Blessures des yeux par des bombes à main pendant la guerre.) *La Clinique Ophtalmologique*, octobre, 1914.

(3) **Darier, A.**—Wounds of the eye in war. (Blessures oculaires de guerre.) *La Clinique Ophtalmologique*, octobre, 1914.

(4) **Spiro.**—Ophthalmological observations from the field. (Augenärztliche Beobachtungen aus dem Felde.) *Centralbl. f. prak. Augenheilkunde*, March, 1915.

(5) **de Lapersonne, F.**—Oculo-sympathetic syndrome; fragment of projectile in the sixth cervical vertebra. (Syndrome oculo-sympathique; fragment de balle dans la sixième vertèbre cervicale.) *Archives d'Ophtalmologie*, mars-avril, 1915.

(6) **Terrien, F.**—Some visual troubles due to shell-burst. (De quelques troubles visuels consécutifs à l'éclatement des obus.) *Archives d'Ophtalmologie*, mai-juin, 1915.

(7) **Cantonnet, A.**—Wounds in war. (Blessures de guerre.) *Archives d'Ophtalmologie*, juillet-août, 1915.

(8) **Lagrange.**—On direct and indirect disorders of the eye caused by firearms. (Des désordres oculaires médiats ou indirects par les armes à feu.) *Archives d'Ophtalmologie*, juillet-août, 1915.

(9) **Bourgeois, A.**—Serious injuries of the eye by wounds in war without immediately apparent lesions. (Traumatisms graves de l'œil par blessures de guerre, sans lésions immédiatement apparentes.) *Archives d'Ophtalmologie*, septembre-octobre, 1915.

(10) **Dantrelle.**—Macular lesions in war injuries. (Lésions maculaires dans les blessures de guerre.) *Archives d'Ophtalmologie*, septembre-octobre, 1915.

(11) **Collins, Sir William J.**—Shrapnel located at back of orbit: Successful extraction. *Lancet*, October 2nd, 1915.

(12) **Finch, G.**—A case of optic neuritis following on "gassing." *Lancet*, November 6th, 1915.

(1) This omnibus article by **Axenfeld**, of Freiburg i. B., covers much ground, although it occupies barely seven pages of the *Centralblatt*. He animadverts against disorganised eyeballs being allowed to remain without treatment in base hospitals. They frequently include portions of the uveal tissue, and may readily lead to sympathetic ophthalmitis at a later stage. After removal of the cornea, these wounded eyes should be exenterated with a sharp spoon. Much may be done by plastic operations, immediate or remote, to prepare the ground for an artificial eye. The chief object of

Axenfeld's communication, however, appears to be to advocate the early diagnosis and treatment of injured eyes. Such injuries should be taken, with the least possible delay, to properly equipped and staffed ophthalmic stations. Failing that, they should go to the nearest eye clinics or departments.

SYDNEY STEPHENSON.

(2) Three cases of eye wounds by hand grenades are described by **Cosmettatos**, of Athens. They were observed in the course of the Greco-Bulgarian war.

In an appendix, **Jocqs**, of Paris, adds two further cases from the present war. The severityof the injuries seems to be the principal feature. S. E.

(3) **Darier**, of Paris, synopsises the various cases of injury to the eye which have come under his notice during the present war, and presses on the authorities the necessity for evacuating these cases as soon as possible, in order that they may quickly come under the care of the specialist.

A few special cases are referred to more particularly.—One of these concerned the occurrence of tobacco amblyopia in an officer who had marched for three days and nights without sleep or food, and who had had recourse to tobacco, in order to assuage hunger and to relieve fatigue. Another case is that of an English surgeon who developed a severe infective irido-cyclitis, as the result of the projection into his eye of pus from a gangrenous abscess upon which he was operating. - ERNEST THOMSON.

(4) From this practical article by **Spiro**, of Berlin, we gather that from the beginning of the war there was a properly equipped eye station belonging to one portion of the German Army at a certain place, the name of which has been suppressed by the censor. There was at first little call upon the services of the station. But this was all changed when the conditions were changed from rapid advance to trench warfare. The admissions then became numerous.

Spiro has a good deal to say about wounds of the eye, penetrating or otherwise. In gaping wounds of the cornea he always employs conjunctival flaps with the best results. In the extraction of magnetic foreign bodies, Hirschberg's hand magnet has fully justified its use. Night-blindness was very common from the middle of December, 1914, but the cases had become rare at the time (March, 1915) Spiro wrote. The examination of the eye, as well as of the field of vision, was nearly always negative in this condition. Retinal changes were found once only in a soldier, aged 28 years. In one instance there were changes in the visual field, the nature of which is not specified. The night-blindness, of which the exhaustion of the nervous system was apparently the cause, usually cleared up in two or three weeks.

Of a very interesting and useful character was the work carried out by ophthalmic surgeons in co-operation with general surgeons, in deciding whether operation was needed in gun-shot wounds of the skull, particularly of a tangential character. Opinions varied considerably as to the necessity of operation in wounds of this kind. An absolute indication pointing in that direction is furnished by "choked disc," which often receded rapidly after trephining, with quick recovery of sight. A less certain indication was hemianopsia when a Röntgen picture showed a slight depression of bone only. In one of Spiro's cases hemianopsia was the sole outstanding sign, although paralysis supervened a fortnight later. Operation was followed by the disappearance of both symptoms. SYDNEY STEPHENSON.

(5) **de Lapersonne**, of Paris, reports an interesting case in which papillitis in the right eye was associated with oculo-sympathetic lesions and paralysis of the limbs of the same side:

A soldier, aged 38 years, was wounded on November 20th, 1914, by a fragment of shell or a bullet lodging in the nape of the neck on the right side. Beside the right-sided palsy which had followed at once, the right eye showed:—slight ptosis, enophthalmos, and some myosis (Horner's syndrome). Pupil reflexes good. Opththalmoscopically, there was well-marked papillitis, with peripapillary œdema to an extent of two disc's diameter, the veins being full and tortuous and partly hidden by œdema. R.V.=·2; field normal. L.V. normal. Skiagrams showed a rather large foreign body situated on the right lamina of the sixth cervical vertebra, apparently involving the trunk of conjugation, and also a bony fragment pressing on the cord.

These findings explained all the lesions present except the papillitis, for which it was difficult to find a cause. There was no history of syphilis or of central trouble and no headache, whilst lumbar puncture showed a normal fluid, without hypertension.

The fragment of bone and foreign body were removed on February 9th, and an improvement at once took place, with disappearance of Horner's syndrome on the following day. By the middle of March, R.V.=·9 and the papillitis had nearly disappeared. BERNARD CRIDLAND.

(6) **Terrien**, of Paris, in his article on ocular injuries sustained during the war, classes his cases into three main groups as follows: direct injuries, followed by anything from a corneal abrasion to destruction of the globe; indirect injuries, such as retinal detachment from a blow in the neighbourhood of the globe or injury to the nerve by *contre-coup*; lesions due to shell-burst in close proximity to the soldier or projectile wounds (bullet, shrapnell, etc.) in the immediate neighbourhood of the orbit.

The last group only is discussed in detail, and is considered as follows:—

1. *Lesions involving the anterior segment of the globe.*—This portion is devoted to an excellent description, perhaps the best so far published, of a type of case with which all in this country who have had the care of "eye cases" amongst the wounded must be familiar. The constant and predominant symptom of the condition is obstinate photophobia, associated with more or less impairment of vision, together with attacks of neuralgic pain along the course of the ophthalmic division of the fifth nerve. In a number of the cases the absence of any apparent lesion leads to a suggestion of malingering or hystero-trauma as an explanation of the symptoms, but a close investigation of the patient, and the failure of treatment on the lines so indicated, have shown that they are not of this nature.

The most constant sign present is circumcorneal injection, with which is associated more or less congestion of the bulbar conjunctiva, blepharospasm, and pupillary and ciliary spasm. A close examination of the cornea may show fine opacities, infiltrates, or minute foreign bodies, but, on the other hand, the structure may reveal no change whatever.

Terrien's explanation is that in the cases where opacities can be seen, fine particles of dust, earth, or powder from the shell-burst have lodged upon and become embedded in the cornea, as would be expected; but in the cases where the cornea appears quite clear, that the epithelium has been disturbed (*craquelé*) by the force of the explosion, and that an invisible lesion has been produced. In short, a corneal injury is present, even when there is no evidence thereof on the cornea itself. The author details three of the twenty-three cases he has observed.

2. *Lesions of the posterior segment.*—These comprise cases of retinal detachment, hæmorrhages, retinal and intra-ocular, together with six cases of disturbance at the macular region reported in full. One of these last two, one of which was bilateral, followed indirect injury to the globe.

3. *Visual troubles without lesions.*—Chiefly these are cases of shell-shock where loss or diminution of vision follows immediately after a shell-burst in the neighbourhood, and may be accompanied by impairment or loss of hearing, together with aphasia. A rapid improvement in vision takes place, but there persists for some time a difficulty in fixation. The only sign sometimes noted is papillary hyperæmia. BERNARD CRIDLAND.

(7) **Cantonnet,** of Paris, describes three conditions which he has met with during the present war:—1. attenuated sympathetic ophthalmitis; 2. eyelashes in the anterior chamber; and 3. papillary stasis as the result of head injuries.

1. de Lapersonne* and his pupil Des Lions have characterised as "attenuated sympathetic ophthalmitis" a form of mild disease, wholly different from what was once called "sympathetic irritation." Cantonnet describes three of these cases, one of which was post-operative and the other two post-traumatic. Although gross discolouration of the iris and thick synechiæ are not found in these cases, yet they represent a condition of irido-cyclitis. Their prognosis is by no means always good. Their recognition is important, since it allows of the proper steps being taken in time.

2. A couple of cases are described under this head.

3. Cantonnet has met with eighteen cases in three months where papillary stasis has resulted from contusion or commotion of the skull. He recognises three classes:—(a) papillary stasis, properly so-called; (b) cloudiness of the edges of the optic disc with slight swelling; and (c) tortuosity of the retinal veins. Of (a) Cantonnet gives details of ten cases, of (b) six cases, and of (c) two cases. He regards all the ophthalmoscopic manifestations as evidences of hypertension of the cerebro-spinal fluid, as proved by their disappearance or improvement after repeated lumbar puncture. Tortuosity of the retinal veins may occur by itself or be accompanied by cloudiness of the edge of the optic disc. It is stated to possess a very characteristic aspect. In addition to the turgescence, the veins over the whole or a part of the retina resemble the neck of a bayonet, particularly within two papilla diameters of the optic disc. This curious change affects principally the large central trunk. SYDNEY STEPHENSON.

(8) **Lagrange,** of Bordeaux, concludes his communication with the following words:

1. When projectiles penetrate into the body they may produce (although at a distance) irreparable disorders in the nervous centres, in the peripheral nerves, and in the organs of special sense, as sight, hearing, and smell.

2. These disorders may be produced without the projectile actually striking the patient. The displacement of air set up by the bursting of a shell brings about the same lesions.

3. In wounds of the face or skull, it is always necessary to make a complete examination of the visual apparatus. SYDNEY STEPHENSON.

(9) **Bourgeois,** of Rheims, reports three cases of injury to the eye, which agree in one particular, namely, that no external changes were visible. No. 1 had sustained a detachment of the retina and atrophy of the optic nerve apparently from being thrown violently upon his face by the bursting of a shell. In addition, there was a fracture of the lower border of the orbit, and a small wound of the median part of the lower eyelid. No. 2 from a similar cause had sustained a deep contused wound of the right eyebrow, together with traumatic mydriasis. No. 3 after the explosion of a shell was found

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* For abstract see THE OPHTHALMOSCOPE, September, 1915, p. 461.

to present a tiny wound in the limbus, and almost complete atrophy of the optic nerve. No trace of a foreign body could be discovered. Bourgeois supposed that a tiny foreign body had penetrated the neighbourhood of the optic nerve, and remained hidden in the sheath or in the nerve itself.

SYDNEY STEPHENSON.

(10) **Dantrelle,** of Paris, writes at considerable length on macular lesions as seen during the present war. He has been struck with the frequence of these injuries in de Lapersonne's work at the Hôtel-Dieu at Paris. He reports six such injuries, and then in the light of those cases and of six others reported by Terrien in the *Archives d'Ophtalmologie* of May-June, 1915*, discusses the ætiology, the pathogeny, and the ophthalmoscopic appearances, and ends his communication with a series of conclusions.

The ophthalmoscopic lesions described by Dantrelle appear to agree in little else than their location in the macular region of the eye. For example, they varied from a mere modification of the retinal reflexes to definite tears in the choroid. By taking them with Terrien's cases, spoken of above, Dantrelle makes two chief groups: 1. pigmentary choroido-retinitis, and 2. more or less complete perforations in the macula, so called "holes," and to these he adds Berlin's opacity, and abnormal reflexes, with or without pigmentary changes. The chief sign was an absolute central scotoma, corresponding in size and shape to the particular lesion. The injuries in Dantrelle's cases were all of an indirect nature, affecting a region which he terms "the dangerous zone"—that is to say, the bones of the face in a zone extending for at least a couple of centimetres around the edge of the orbit. These injuries must be differentiated from the much rarer changes of direct traumatism due to contusion, as in close-by explosions or "windage" of the eye.

SYDNEY STEPHENSON.

(11) The account of this case, which was treated on ordinary surgical lines, by **Sir William Collins,** of London, is accompanied by a very convincing radiogram showing the situation, and by a drawing showing the size and detail of the piece of shell.

ERNEST THOMSON.

(12) The case reported by **Finch**, R.A.M.C.(T.), is, in brief as follows:

A soldier was "gassed," the gas causing irritation to the throat, nose, and eyes. On the following day he suffered from headaches, was taken prisoner, and in a few days began to lose his sight. This was in May, 1915. Presumably he was exchanged. At any rate, this soldier was admitted to the Third London General Hospital in August, 1915, with R.V. = P.L. only, L.V. (corrected with + 6D. sph.) 6/36, and secondary optic atrophy, the papillæ being 2D. prominent relatively to each fundus. There was nothing to suggest a constitutional cause. Wassermann negative.

It was suggested by R. R. Cruise, under whose care the patient had been, that the condition may be an infective neuritis, possibly associated with ethmoiditis due to the gas.

ERNEST THOMSON.

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*For abstract see p. 617 of the present number of THE OPHTHALMOSCOPE.

VI.—THE ABDERHALDEN REACTION IN OPHTHALMOLOGY.*

Frenkel, H. and Nicolas, E.—The reaction of Abderhalden in ocular pathology. (La réaction d'Abderhalden en pathologie oculaire.) *Archives d'Ophtalmologie*, janvier-février, 1915.

After briefly recapitulating the work done in this subject by Gebb and Römer, Hegner, E. von Hippel, George Berneaud and Jendralski, **Frenkel** and **Nicolas,** of Toulouse, give their personal results as obtained from forty patients suffering from ocular diseases.

In the *technique* followed by them, many control tests were employed—the eyes of the horse, pig, calf, and cow being used, and in half the cases the optical method was carried out in addition to the chemical one. To this unusual care, combined with the strictest antiseptic precautions, the authors attribute the difference in the percentage of their positive results as compared with that of others.

The 40 cases comprised 27 cataracts (senile, traumatic, and one congenital), 5 cases of iritis, irido-cyclitis, or irido-choroiditis, 2 of interstitial keratitis, 2 hypopyon-ulcers, and one case each of glaucoma, scleritis, vitreous opacities, and specific ocular paralysis. With very few exceptions, the reactions in all were negative.

The exceptions were as follows:

Four cataract cases showed slight positive reactions and in three of these repeat and control tests were negative.

One case of interstitial keratitis gave a feebly positive reaction, negative with control tests.

The authors regard these positive results as being due to fortuitous circumstances in all save the one cataract exception, for which they offer no explanation.

They conclude that none of the cases examined showed in their respective sera proteolytic ferments with appearance of dialysible products.

BERNARD CRIDLAND.

VII.—RECOVERY OF VISION IN BLIND CHILDREN.

(1) **Augstein, Carl. — Observations on the visual education of a congenitally blind boy, fifteen years of age, after successful operation. (Beobachtungen nach erfolgreicher Operation eines 15jährigen Blindgeborenen über sein Sehenlernen.)** *Klin. Monatsbl. f. Augenheilkunde*, October-November, 1913.

(2) **Fisher, J. Herbert.—Observations on the learning of vision, after a successful operation, at the age of six years, in a congenitally blind patient.** *Ophthalmic Review*, June, 1914.

(1) **Augstein,** of Bromberg, removed congenital cataract, with capsular thickening, from both eyes of a boy, fifteen years of age. The left eye was divergent and gave a poor visual result. The details refer to the right eye.

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* For abstracts dealing with this subject, *see* THE OPHTHALMOSCOPE, 1914, p. 164.

The operation was discission with two needles, and repeated operations were necessary. Before operation, there was good light projection and coloured lights could be recognized. The eye was in constant motion, never looking straight forward. The boy was delicate and intellectually backward.

The testing of the vision began fourteen days after the last operation, and for a week after that, he behaved like a blind person, knocking against objects which were in his way, and always feeling objects presented to him. He was not particularly happy about the state of his vision, and suffered much from confusion. About the fourth or fifth week, he began to recognize objects and persons, and had more security in walking and in avoiding furniture, etc. After the fifth week, he made rapid progress. When he had once learned to know an object with the assistance of his sense of touch, he could always recognize it again easily, even in different sizes and forms, *e.g.*, scissors of whatever size or pattern. He quickly learned to recognize by the eye round and triangular forms and to judge distance and size. The field of vision, at first tubular, widened as time went on. Central fixation established itself in about eight weeks, but even at the time of publication, six months after operation, continuous fixation was impossible. The fundus was found to be normal. Refraction was difficult to estimate, but +10D. was approximately correct, and after this glass was ordered, there was rapid improvement in vision, which rose in five days from fingers at 2 metres to 5/50. The boy now goes about easily like a normal-sighted person, and is quite pleased with his new vision.

The author points out that the stages of recovery observed in this case after operation are sometimes seen in cases temporarily blinded from blepharospasm. In both cases he thinks we are dealing with amblyopia from disuse, and he places the primary loss of function in the retina, although he cites no *data* to show why it would not be equally justifiable to locate it in the cerebral centres, or in the visual apparatus as a whole.

A. J. BALLANTYNE.

(2) The case reported by **Fisher**, of London, is of a girl whose sight was noticed to be defective when six weeks' old. The right eye had been treated at the age of four, but without material good. She had since attended a Blind School. He found the right eye had a pupil blocked with posterior synechiæ, and a vision of barest hand shadows; in the left was a dense cataract with thick capsule; there was an active pupil, and good perception of light. Three days after the operation, the child did not identify objects by sight, but could do so by the aid of other senses. At the end of a week, with a rough correction of the refraction, further testing showed that she could recognize objects only by touching them, although she saw them, for on being shown a pair of scissors after a glass, which she identified by touch, she called them glass also, until allowed to handle them. Four weeks after operation, she was wearing her correction constantly and was making progress, being able to recognize a watch, book, and other things, but still requiring the assistance of other senses in many instances. She has continued to improve, but her judgment of space and position is still faulty (*i.e.*, six months after operation). A. H. PAYAN DAWNAY.

VIII.—REMEDIES.

(Tenth Notice.)

(1) **Parker, H. C.—A case of relapsing acute iritis apparently cured by the use of autogenous vaccine.** *Ophthalmic Record*, August, 1914.

(2) **Hurd, Lee M.—Hyoscine and morphine as a preliminary to local anæsthetics.** *Ophthalmology*, April, 1915.

(3) **Jones, E. L.—Detachment of retina cured by galvanopuncture of sclera, combined with subconjunctival injection of mercury cyanid.** *Annals of Ophthalmology*, July, 1915.

(4) **Arganaraz, Raul.—Some contraindications of the use of salvarsan. (Algunas contraindicaciones del Salvarsan.)** *Boletin de la Sociedad de Oftal. de Buenos Aires*, No. 2.

(1) **Parker**, of Indianapolis, treated a case of iritis which relapsed twice under the usual treatment, by subcutaneous injections of an autogenous vaccine (50 to 65 millions of a mixed culture grown from the secretion expressed from enlarged vesiculæ seminales). In three weeks the eye was perfectly quiet, after persistent inflammation lasting four months. The patient had gonorrhœal urethritis sixteen years before this attack. To all appearances this had been cured at that time, but he had developed an iritis with rheumatism a year later. Until the present attacks there had been no sign of recurrence. J. JAMESON EVANS.

(2) **Hurd**, of New York, points out that shock is partly psychic and partly sensory in origin, and that the *rationale* of the combined use of hyoscine-morphine and local anæsthetics is to block the paths by which both the psychic and the sensory impressions reach the centres. His personal experience of the method seems to have been obtained in the field of oto-laryngology. He finds it of great service in certain cases, but not suitable for use as a routine method. One cannot overlook the drawbacks. For instance, it is necessary to have the patient under personal observation for from three to five hours; no regularity of dose is possible, each case having to be treated on its merits; and not only does the method occasionally fail, but some cases show disconcerting, or even alarming, symptoms. A. J. BALLANTYNE.

(3) **Jones,** of Cumberland, Md., U.S.A., having met with nothing but disappointment from the use of sub-conjunctival injections in the treatment of detachment of the retina, tried galvano-puncture, combined with the massive sub-conjunctival injection of cyanide of mercury, with dionine and morphine. The result was excellent. A later case in which the same treatment was employed, unfortunately disappeared from his care. R. H. ELLIOT.

(4) **Alganaraz**, of Tucuman, gives short accounts of a number of cases in which the administration of salvarsan has been followed by severe disturbance of the eye. He concludes that optic neuritis following the use of salvarsan —whether it be syphilitic or toxic in origin—is made worse by further doses of '606,' and that therefore in the presence of optic neuritis the use of '606' should be forbidden absolutely. Further, since optic neuritis is slow in its development, the fundi should be examined in routine in all cases where '606' is given that its use may be suspended at the first sign of danger.

H. GRIMSDALE.

IX.—OPERATIONS.

29.—Cataract.

(1) **Petit, Paul.**—On the extraction of cataract with a small conjunctival flap. (Sur l'extraction de la cataracte avec petit lambeau conjonctival.) *Ann. d'Oculistique*, septembre, 1914.

(2) **Ewing, A. E.**—A new conjunctival flap incision in cataract extraction. *American Journal of Ophthalmology*, April, 1915.

(3) **Blanco.**—The best flap for extraction of senile cataract. (Colgajo queratico optimo para la extracción de la catarata senil.) *Archivos de Oftalmologia Hispano-Americanos*, July, 1915.

(4) **Clegg, J. Gray.**—A method of artificial maturation of cataract allowing of early extraction. *Trans. Ophth. Society U.K.*, Vol. XXXV, 1915, p. 347.

(1) When performing cataract extraction, **Paul Petit**, of Rouen, makes a corneal incision at the level of the limbus and ends with a small free conjunctival flap a few millimetres broad and long. He almost always does an iridectomy.

He compares this method with that of extraction through an incision with a conjunctival bridge, as recommended by Vacher and Denis, and gives the following reasons for preferring it.—1. Inversion of the flap is so rare an accident that it does not call for special precautions. 2. Prolapse or incarceration of the iris is rare when iridectomy is performed. 3. The protection against loss of vitreous afforded by the conjunctival bridge is more than counterbalanced by the interference with delicacy of manipulation in cases in which the delivery of the lens is difficult. 4. Post-operative astigmatism is slight. 5. The flap unites rapidly, gives good protection against infection, and tends to prevent capsular incarceration, which is facilitated by the iridectomy. The only disadvantage which the author attributes to the conjunctival flap is the risk of slight hæmorrhage obscuring the operative field.

These views appear to coincide with those held by the majority of British ophthalmic surgeons. R. J. COULTER.

(2) **Ewing**, of St. Louis, introduces an ingenious modification of the conjunctival flap in cataract extraction. The procedure is simple, but demands a special double fixation forceps, the jaws of which grasp the conjunctiva on each side of the cornea about the horizontal meridian. The effect of this grip is slightly to pull down the conjunctiva over the cornea. The incision is then made in the usual way, and, when the forceps grip is released, there is a small conjunctival flap which has the great advantage of spreading laterally, so as to cover the puncture and counter-puncture, and which spreads out from the cornea at the sides "like small wings." Accompanying drawings illustrate the method of operation both when performed in the usual way with the Graefe or other similar knife and when performed with the lance knife. ERNEST THOMSON.

(3) **Blanco**, of Valencia, examining the *pros* and *cons* of various incisions, decides that it is necessary, to allow the escape of the cataract, that the incision should be at the base little less wide than the horizontal diameter of the cornea. Its height will be about 3 or 4 millimeters. He fixes the

eye by an "internal" hold, at the end of the horizontal diameter. This makes it easier to cut the flap symmetrically. The line of the section should lie in the sclero-corneal junction, and there should be made a small conjunctival flap which makes the healing process easier. This flap may be 2 millimeters high. He prefers the superior section. H. GRIMSDALE.

(4) **Clegg,** of Manchester, massages the lens capsule after paracentesis of the anterior chamber. Further massage is made with the smooth lens-scoop applied to the outer surface of the cornea. Atropine is used before and after these procedures. Definite opacification of the cortical layers of the lens is common within two or three days. In several of Clegg's cases extraction had been done on the seventh day after the first operation. "This method," remarks the author, "allows a business man who is becoming incapacitated for his work, to have maturation and extraction done and recovery to take place within the shortest possible space of time. Under the most favourable circumstances he need only be confined to the nursing-home or hospital for three or three-and-a-half weeks." SYDNEY STEPHENSON.

30.—Ptosis.

(1) **Thibert.—Complete traumatic bilateral ptosis cured by Motais' operation. (Blépharoptose traumatique complète et bilatérale guérie par l'opération de Motais.)** *L'Ophtalmologie Provinciale*, mai, 1914.

(2) **Giordano.—The surgical treatment of paralytic blepharoptosis. (La cura chirurgica della blefaroptosi paralitica, con speciale riguardo al metodo Angelucci.)** *Archivio di Ottalmologia*, May-June, 1915.

(1) **Thibert,** of Liége, describes the case of a youth of seventeen who was severely injured on the 21st February. His head was caught between a metal platform and an iron bar. The integument in the region of his eyebrows was torn away, there was a fracture with depression at the root of the nose, the ethmoid was exposed, the anterior part of the cranial vault was fractured, the two incisors on the right side were knocked out, and there was a fracture of the superior maxilla at that spot. The torn integument hung in strips from his face. He was treated for five months in the civil hospital at Namur. His improvement was remarkable. There was good air-way through each nostril, and his lacrymal passages were patent. He was unable, however, to raise his upper lids without the help of his fingers.

An unsuccessful attempt was made in May to unite the right upper lid to the muscles of the forehead and eyebrow. When he came under the care of the author, the condition was more than ptosis, for the upper lids completely covered the eyeball as well as the margins of the lower lids. The eyelashes of the lower lids were sodden and glued to the skin; indeed, they could not be inspected until the upper lid was raised by the fingers. The encroachment of the upper lid on the lower measured, in the middle, ten millimetres in the right eye and eight in the left. There was a good deal of conjunctivitis. The movements of the eyeballs, although limited, were well maintained in all directions.

The author discusses the pathology of the condition and gives his reasons for selecting Motais' operation instead of any of the various procedures recommended for raising the upper lid. The disadvantages of Motais' operation were the extreme degree of the ptosis, the consequent dragging on the stitches, and the feebleness of the muscle. The right eye was operated on and proved successful. At the completion of the operation there was a total ectropion of the upper lid and the upper extremity of the conjunctival surface was everted and had a triangular projection, this was remedied by the excision of a small fragment of the tarsus at its summit. In order to avoid lagophthalmos, the lower lid was drawn up to the brow by means of a stitch. Both eyes were bandaged. When the sutures were removed on the eighth day, the palpebral opening measured ten millimetres at its widest part, which meant a total raising of 20 millimetres. The palpebral fissure was triangular in shape owing to the slenderness of the muscular insertion and also to the fact that it was attached at a point and not over a wide area. The lid acted normally, and during sleep, the orbicularis muscle was able to counteract any lagophthalmos. The operation on the left eye was equally successful. P. A. HARRY.

(2) **Giordano,** of Naples, runs through the forms of operation which have been suggested for the surgical treatment of ptosis, and finds them all wanting, with the exception of the method of Angelucci. He has found Motais's operation uniformly unsuccessful on account of the muscular inefficiency which it entails. And it is specially unsuitable in paralytic cases, in which the superior rectus is often affected as well as the levator. For these cases there is no method so effective as that of Angelucci, which consists, as is well known, in attaching the tendon of the paralysed levator to the frontalis. It gives a satisfactory attachment of the frontalis to the lid, and does not produce false skin folds, which spoil the appearance after such operations as Hess's. (The present reviewer can uphold, from experience, the value of Angelucci's operation, although he thinks Giordano has rather exaggerated the defects of Hess's method.) H. GRIMSDALE.

31.—Lamellar cataract.

(1) Critchett, Sir Anderson.—Small optical iridectomies in a case of **lamellar cataract.** *Proceedings Royal Society of Medicine: Section of Ophthalmology*, January, 1915.

(1) **Critchett,** of London, exhibited a case in support of his contention that in proper cases lamellar cataract should be treated by the performance of a small optical iridectomy. In suitable cases the lens should show a small, well-defined nucleus, and an absolutely clear margin. The operation should be done under a general anæsthetic with a very sharp bent needle, and the iris should be withdrawn with a small hook. SYDNEY STEPHENSON.

32.—"Couching."

(1) Hudson, A. C.—Cyclitis with spontaneous subluxation of lens, **treated by couching of lens.** *Royal Society of Medicine: Section of Ophthalmology*, April, 1915, p. 91.

(2) **Hudson, A. C.—Traumatic dislocation of lens treated by couching and subsequent separation of iris adhesion at angle of anterior chamber with cyclodialysis.** *Ibidem*, p. 92.

(1 and 2) **Hudson**, of London, has treated two cases of dislocation of the lens by "couching." The first was in a woman, aged 56 years, where cyclitis of one eye was complicated with dislocation of the lower border of the lens through the pupil, and increased intra-ocular pressure. V.=3/60. The lens was dislocated downwards in the vitreous by means of a needle curved upon the flat, introduced at the lower angle of the anterior chamber, with the concavity of the blade directed backwards. Result, some seven months after operation, corrected vision 6/9, and T.n. The second operation, in a male, aged 63 years, was on account of a traumatic dislocation of the lens into the anterior chamber. Intra-ocular tension remained high after the lens had been dislocated, as in the first case, into the vitreous chamber. Some three and a half months later, an adhesion of the iris to the cornea and sclera was separated by the operation of cyclodialysis. Corrected vision, about three months later, was 6/60. SYDNEY STEPHENSON.

33.—Acute Glaucoma.

(1) **Heerfordt, C. F.—The mechanism and cause of so-called acute malignant glaucoma and the means of combating it. (Ueber die Entstehungsart und die Ursache des sogenannten acuten Glaucoma malignum und ueber die Mittel zu seiner Bekämpfung.)** *Actes du XII Congrès International d'Ophtalmologie*, Petrograd, 1914.

(2) **Burnham, G. Herbert.—The operative treatment of acute glaucoma.** *Canada Lancet*, May, 1915.

(1) **Heerfordt**, of Copenhagen, is of the opinion that the malignant glaucoma (von Graefe) which ensues in some cases of simple glaucoma after operation, is an expression of venous stasis resulting from narrowing of the vortex veins when the intra-ocular pressure is lowered. He calls it "ex-operative hæmostatic glaucoma."

The treatment is two-fold, *viz.*, therapeutic and prophylactic. Under the first head he says the rational therapy consists in the operative opening of the closed vein, but he does not indicate how this is to be done. As regards prophylaxis, he says his practice in operating upon cases of chronic glaucoma is as follows.—For the three days before operation he keeps the tension at or below normal by use of pilocarpine, venæsection, and puncture of the anterior chamber, with partial evacuation of the aqueous. Two and a half hours before operation, he places pilocarpine in substance in the conjunctival sac. After operation, he uses 2½ per cent. pilocarpine solution three times daily. A. J. BALLANTYNE.

(2) **Burnham**, of Toronto, operated upon a case of acute glaucoma by modifying Elliot's operation in the following way.—Under the influence of epinine and cocaine, he incised the conjunctiva and turned it down over the cornea in the usual way. He then slit the layers of the cornea, as recommended by Elliot. Next, he passed the keratome of the Bardsley sclerectome through the sclera until it emerged in the anterior chamber, where it could be plainly seen. The punch part of the instrument was then brought into play, and by

those means the aperture was made instantaneously at the sclero-corneal junction. Iridectomy was done through the opening made by the keratome and not through the punch opening. As the conjunctiva was swollen and stiff, a suture was applied. Result excellent (V. = 6/9(2 letters), T.n., etc.). As the result of his experience, Burnham thinks highly of the Bardsley instrument.

SYDNEY STEPHENSON.

34.—Chronic Glaucoma.

(1) **Laws, W. G.—Herbert's short-flap operation for glaucoma.** *Proceedings of the Royal Society of Medicine: Section of Ophthalmology*, Vol. VII, No. 8, p. 125, June, 1914.

(2) **Herbert, H.—The ideal glaucoma incision.** *Proceedings of the Royal Society of Medicine: Section of Ophthalmology*, Vol. VII, No. 8, p. 127, June, 1914.

(3) **Harman, N. Bishop.—A variable flap operation for chronic glaucoma.** *Proceedings of the Royal Society of Medicine: Section of Ophthalmology*, Vol. VII, No. 8, p. 132, June, 1914.

(4) **Verhoeff, F. H.—Scleral puncture for expulsive sub-chorioidal haemorrhage following sclerostomy.—Scleral puncture for post-operative separation of the chorioid.** *Ophthalmic Record*, February, 1915.

(5) **Guglianetti, Luigi.—On the processes of cicatrisation of the wounds made in the operations of corneo-sclerectomy for glaucoma, and the permeability of the cicatrix. Sui processi di cicatrizzazione delle ferite consecutive alla corneo-sclerectomia anti-glaucomatosa, e sulla permeabilita della cicatrice.)** *Archivio di Ottalmologia*, March-April, 1915.

(6) **Di Marzio.—Sclero-corneal trephining. Trapanazione sclero-corneale.)** *La Clinica Oculistica*, May-June, 1915.

(7) **Todd, Frank C.—An operation for glaucoma—filtration secured by a leech-bite incision.** *Annals of Ophthalmology*, July, 1915.

(1) **Laws**, of Nottingham, stated that he had, during the last four years, operated upon practically all his glaucoma cases, by Herbert's "short-flap" method. He concluded from his experience that the primary incision in the sclera should not be more than 2 mm. from the edge of the cornea; if made further back, it was difficult to enter the angle of a shallow anterior chamber, and with a thin sclerotic, a hernia of the ciliary body might occur. After using Harman's scissors extensively, he had returned to the Herbert bayonet-shaped knife; there was then no need to turn down a conjunctival flap, an iridectomy was generally unnecessary, and probably the edges of the incisions were less bruised than by the scissors. Laws thought that the reduction of traumatism to a minimum was an important factor in the success of all glaucoma operations. This view may be contrasted with Ridley's, who has invented an ophthalmic hack-saw designed to bruise the sclera to the uttermost. (*Quot homines, tot sententiæ!*). The author then proceeded to discuss the safety and the efficiency of the operation. In 140 operations he had had only three cases of intra-ocular hæmorrhage. No other accidents had been experienced.

As regards efficiency, he had been able to follow up two-thirds of the cases. Sixteen were failures; the tension not being completely normalised. We gather that the remainder were successful; that is to say, that of the cases which were followed up, 83 per cent. had been cured. This figure can hardly have been approached by the results of any other method for treating glaucoma. T. HARRISON BUTLER.

(2) **Herbert,** of Nottingham, after paying tribute to Elliot's work and alluding to the enormous success of trephining, considered one of the disadvantages of the operation—late infection. Time had yet, he said, to show the extent and gravity of this liability. He believed that the danger was largely avoidable and unnecessary. There is no evidence that the late septic disasters already published are attributable to errors in *technique*. On the contrary, any wide open sclero-corneal fistulous track quite close to the limbus must produce the localised vesicular conjunctival patch, which is mainly responsible for the liability to infection. Trephining is calculated to produce the maximum of localized effect upon the conjunctiva, because it is now made far forward where the conjunctiva is thin and adherent; because the circular opening concentrates the aqueous presence upon a small area; and because generally there is no provision for restricting the leakage of aqueous to the minute quantity needed in many cases.

Herbert outlined the *technique* necessary to keep the conjunctiva as nearly normal as possible. To facilitate the backward flow of aqueous, the fistula must debouch about a millimetre behind the limbus in the area where the conjunctiva is loosely attached. Since at the deep surface of the cornea any operative wound should lie well forward, and away from the iris-root, it follows that the track must be oblique, not direct. Again, the filtering passage must be extended more or less widely parallel with the corneal margin to widen the area of diffusion under the conjunctiva. But, whereas it is recognised that large incisions are dangerous in glaucoma, it is obvious that the ideal incision will be small on the deep corneal surface and widen out fan-wise to reach the superficial surface of the cornea. Such an incision can be effected by sawing from within outwards after reflecting the conjunctiva. If the cutting be done slowly and obliquely, and stopped as soon as aqueous escapes, the ideal incision will be made. Herbert states that these small flap sections are comparatively easily kept open as compared with punctures made with the keratome. The reason is not obvious! If wide diffusion of aqueous is to be obtained, the conjunctiva must be interfered with as little as possible. If it become cicatrized and adherent, the flow of aqueous will be greatly restricted. In 1901 Herbert infolded a long conjunctival flap into such an incision as we have described. The results were variable, and in one case late infection occurred. In chronic non-congestive glaucoma, the incision can be kept open by fixing a small gilded metal rod on a knotted thread in the wound for twenty-four hours. A certain amount of irritation and discomfort is caused, but Herbert thinks the method worthy of trial and elaboration. It is not applicable to all forms of glaucoma. T. HARRISON BUTLER.

(3) **Harman**, of London, has made an ingenious modification of his well-known twin scissors, with a view to improving Herbert's "small-flap" operation. The ends are now approximated, so that they isolate the flap, with the exception of a delicate pedicle. The flap produced is, in Harman's expressive language, as "mobile as the leaf of the black poplar." The suggested operation is performed as follows.—The conjunctiva is reflected in the usual manner. With a small bent keratome a cut is made, 4 mm. wide, 2 mm. from the apparent edge of the cornea. The flap is now cut from the sclera with the scissors. The flap may now be left *in situ*; it may be

twisted through 180°, when it will slightly twist, or raised a little when it is sutured in place; or, finally, it may be removed entirely. This is advisable when the sclera is very tough. A basal iridectomy should be performed. Massage of the eye should be commenced upon the third day, and one drop of atropin instilled. Harman has operated upon five eyes by this method. The flap looks white, and resembles a foreign body. The operation is easy, and causes no discomfort to the patient.

T. HARRISON BUTLER.

(4) **Verhoeff**, of Boston, Mass., describes his experience with a case of expulsive chorioidal hæmorrhage following immediately on uncomplicated sclerostomy with buttonhole iridectomy for chronic non-inflammatory glaucoma About half the vitreous escaped through the sclerostomy wound before the conjunctival flap was sewn up. After tying up the eye and waiting about four hours he decided to let out the sub-chorioidal blood through a scleral puncture. The first puncture was made in the nasal side about 10 mm. from the limbus, but as little blood escaped from this puncture, two punctures were then made on the temporal side and from these blood flowed freely, though the eye filled up again immediately the knife was removed. The patient was put to bed and next day the pain increased and a considerable amount of blood escaped from the eye, but 48 hours after the operation the anterior chamber was re-established and contained a large hyphæma and the bulbar conjunctiva was congested and chemosed. Nine days after the operation, the tension was normal, the chemosis had disappeared, and the hyphæma was almost gone. On the eleventh day, the anterior chamber was again obliterated, probably due to separation of the chorioid, but the tension was normal and the patient could count fingers at six inches. One week later, the anterior chamber had almost completely re-formed, the tension was still normal, and vision 20/200. A month after the operation, there was a well-marked "bleb" at the site of operation, tension normal, media were clear and fundus was normal, apart from glaucomatous excavation of the disc present before the operation.

Verhoeff was equally successful in relieving persistent post-operative separation of the chorioid by scleral puncture. J. JAMESON EVANS.

(5) In this long paper **Guglianetti,** of Naples, gives the results of the microscopical examination of three human eyes on which the operation of trephining had been performed for secondary glaucoma. In all, the gap made by the trephine in the sclero-cornea was found to be blocked by a fibrous tissue, rich in fusiform cells and without lacunæ, joining the edges of the cornea and sclera.

Guglianetti has made a large number of experiments on the eyes of rabbits (more than fifty in all), and in none has been able to find any evidence of such a filtering scar as is demanded by the hypothesis usually received. Only in those cases in which there was some prolapse of the iris did he find evidence of the passage of fluid from the anterior chamber into the subconjunctival tissue. H. GRIMSDALE.

(6) **Di Marzio,** of Rome, discusses the operation of sclero-corneal trephining, and concludes that Elliot's method needs certain modifications to make it safe.—He makes the dissection of the corneal flap extend rather lower than in the original, and places the trephine, which has a crown of 2·5 mm., entirely on the cornea, so that the upper edge of the trephine is tangential to the sclero-corneal junction. The trephine has a guard at 1 mm., so that it may be pressed firmly on the globe without any risk of danger to the deeper parts. He makes an iridectomy as a constant part of the operation (in this he is in agreement with many English surgeons).

Di Marzio lays special stress on placing the trephine well forward, because, although in the normal eye the ciliary body is behind the sclero-corneal junction, in glaucoma the lens, the ciliary body, and the iris base are all pushed forward, as was shown long ago by Priestley Smith, and are more exposed to injury therefore. H. GRIMSDALE.

(7) **Todd**, of Minneapolis, has found the Elliot operation an excellent procedure, but has come to the conclusion that it is not suitable for all cases, and that there are glaucomatous eyes in which a lesser operation, producing a smaller opening, is preferable. He has tried the Herbert operation, but found it very difficult when done with an ordinary cataract knife, and has therefore devised a keratome which makes a tri-radiate incision, thus producing three flaps. He claims that such an incision is very difficult to close, even by sutures. The incision may either be made subconjunctivally, or under an Elliot flap. Todd does not propose that his operation should replace Elliot's trephining, but rather that each should be used according to the indications of different cases. He reports a case in which he trephined one eye, and did a "leech-bite" operation on the other; both did well, but in the latter there was a strong and sufficient filtering scar, whilst in the former there was a swollen bleb. R. H. ELLIOT.

35.—Keratoplasty.

Ortin, Leoz.—Studies and experiments on keratoplasty. (Algunos estudios y ensayos queratoplasties.) *Archivos de Oftalmologia Hisp.-Amer.*, Mao, 1915.

Ortin has experimented on rabbits and has succeeded in these animals in removing the whole cornea and replacing it without apparent damage. In this procedure he made a small incision with a knife and cautiously enlarged it with scissors; as the incision grew, he closed it with sutures until when the last part of the incision was made there was only a small gap which two sutures united. In this way, though the cornea was entirely separated from its attachments, it remained in its proper relative position, and the nerves therefore had the best possible opportunity of uniting rapidly.

He has made many attempts to transplant the cornea from one rabbit to another and has had considerable success; but the operation presents many difficulties. He is convinced that the exposure of the new cornea to the aqueous is unattended by any risk, and thinks that Hippel's procedure is objectionable, because it lays the epithelium of the new cornea against the parenchyma of the old. H. GRIMSDALE.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.

TINCTURE OF IODINE IN EYEWORK.

To the Editor of THE OPHTHALMOSCOPE.

DEAR SIR,

In THE OPHTHALMOSCOPE for July 1915, page 326, I note that you, Sir, discuss the use of tincture of iodine as a disinfectant for the eye. In this connection it may be of some service to call attention to a simple procedure that I have employed for the past three years in all my needling operations. After the eye is cocainized, an area at the limbus is dried by means of a cotton swab. Then another toothpick armed with a small amount of cotton is dipped into tincture of iodine and applied to the dried spot. After waiting a few seconds or a minute, the knife needle is passed through the spot thus disinfected. I almost always make the puncture through the conjunctiva at the limbus, but the iodine may be applied to the cornea itself without harm. It is important to dry the spot to which the iodine is to be applied, as otherwise the solution will spread over an unnecessarily large area and also will be less effective as a disinfectant. The application causes only a slight local congestion which soon disappears.

Very truly yours,
F. H. VERHOEFF.

MASSACHUSETTS CHARITABLE EYE AND EAR INFIRMARY.
233, CHARLES STREET, COR. FRUIT STREET.
25*th October*, 1915.

BOOK NOTICES.

The American Encyclopedia and Dictionary of Ophthalmology. Edited by CASEY A. WOOD, M.D., C.M., D.C.L., assisted by a large staff of collaborators. Volume IV. Cocaine to Conjunctivitis phlyctenulosa miliaris. Chicago: Cleveland Press, 1914.

The fourth volume of the "American Encyclopedia and Dictionary of Ophthalmology" is of much interest in virtue of the importance of the three or four principal subjects with which it deals.

The various headings having the word "Color" in common, from "Color Adaptation" to "Color Vision Theories," extend altogether to 148 pages. There are about 150 such headings, most of them short, but several of considerable length, such as the articles by Charles P. Small (Color Sense and Color Blindness) and C. Ladd Franklin (Color Vision Theories). They are well illustrated.

The article on "Comparative Ophthalmology," by Casey A. Wood, is the longest in the volume, 244 pages; while that on "Congenital Anomalies," by W. F. Hardy, comes into second place with 187 pages.

Casey A. Wood's article on "Comparative Ophthalmology," a subject upon which the writer is a known authority and original worker, is an attempt to make a subject of much complexity more or less understandable to the many. So much, indeed, has the writer realised the probable depths of ignorance of some of his readers—and among the unfortunates the reviewer humbly places himself—that he has given a list of elementary text-books in which the foundations of this many-sided subject may be studied before attempting to appreciate the article in question. Such preliminary education is indeed necessary, and it is no disparagement to say that the article will probably be best appreciated by those who have a good working knowledge of zoology. But to any reader of intelligence, whether or not properly able to value the immense erudition represented by original as well as collective work, which is throughout discernible, the article is in one respect disappointing. The magnitude and complexity of the subject and the iron-bound necessity for compression are factors which must have made it very difficult to write. It is certainly difficult to read. Yet, for this the writer cannot entirely blame such factors, nor yet want of education in some of his readers. The labour involved in writing this digest—for such it is—and illustrating it with so many beautiful and often original drawings has been to some extent lost by insufficient editorial or sub-editorial attention, mainly, but not entirely, concerning the proper corrĕlation of the text and illustrations. Hence, and hence only, the disappointment. The reviewer, struggling with the difficulty presented by his own want of knowledge, as well as with that for which he blames the afore-mentioned hypothetical sub-editor, has nevertheless gathered a great amount of information from the study of Casey A. Wood's article.

The article on Congenital Anomalies, by W. F. Hardy, is a fascinating one. The subject is fascinating by nature. Every clinician knows the joy which uplifts him when he meets with a rare anomaly, and the writer has realised the interest taken in such anomalies. He writes in scholarly fashion ; covers the field of knowledge thoroughly well—see, for example, the long account of microphthalmia with cyst—and appends a bibliography extending to fifteen pages of small print. Most of the illustrations are in black and white. As is perfectly natural, many of them are familiar. It is worth noting that Congenital Cataract finds its place here as well as under Cataract in Volume II. It may be pointed out that the figure on page 2926 and the legend beneath are at variance. Some quite avoidable errors in the spelling of authors' names are to be found both in the text and in the bibliography.

In a useful article, the late C. A. Oliver has summarised our knowledge of the ætiology and treatment of Conical Cornea ; but, so far as one can see, it has not been brought up to date.

Many paragraphs dealing with the Conjunctiva occupy the concluding 127 pages of this valuable and important volume. ERNEST THOMSON.

Blindness Produced by Injuries in Warfare. (La cécité par blessures de guerre.) By DR. FÉLIX LAVABRE. Lyons : A. Rey, 4, Rue Gentil. 1915.

Dr. Lavabre's Lyons thesis deals, both medically and sociologically, with the important question of those blinded in warfare. It covers a good deal of ground, and at the present moment especially is well worthy of perusal.

The conclusions are as follow :

1. We consider as blinded by war all soldiers who have lost by the

action of projectiles the faculty of working and earning their living by their eyes, and who present an acuity of vision of less than one-tenth.

2. We report thirty cases of men blinded by war, collected from the ophthalmological centre of the XIVth region, controlled by Professor Rollet.

3. The projectiles of war are three in number: bullets, shells, and trench mortars (*crapouillots*).

4. The bullet: (*a*) The entire bullet was responsible for 55 per cent. of the blinded; it damaged the visual apparatus (10 cases in 16). Its action is often direct, injuring the eyeballs themselves. It is sometimes indirect, involving the optic tracts and the visual centres. The direction taken by the bullet may be transverse, that is to say, involve the transverse region of both eyes, or be parallel to them. In the course of our observations we have seen it damage *en séton* the two globes or divide the optic nerves. Its direction may be oblique, in which case, as we have observed, it may damage one eyeball and contuse the other. By passing in some other direction it may determine blindness by compression of the visual centre. The mechanism of the lesion may consist of contusion, slight or severe, perforation, or traumatic enucleation.

(*b*) A bullet may also damage the visual apparatus by its fragments. In general, their action is direct; the fragments damage the globe directly. They lead to perforation of the eyeball.

(*c*) The bullet leads to damage of the eyeball by the foreign bodies which are raised by its impact. Their action and their mechanism are the same as those of fragments of bullet. The wounds which they produce are menaced by acute infection: panophthalmitis; chronic infection: iridocyclitis, phthisis bulbi.

5. Shell is responsible for about one-third of the blindness (10 cases among 30). It acts by itself (explosion), or by fragments or by bullets. Its mode of action is, in general, direct. Fragments strike the eyeball directly, but sometimes indirectly. Shrapnell bullets may follow a trajectory analogous to that of a transverse bullet. We have seen such a case. The mechanism is usually that of perforation. Such wounds are particularly liable to become infected, especially when inflicted by fragments of percussion shell, which burst in contact with soil and become dirty.

6. The trench mortar as well as the grenade and the bomb thrown by hand, has furnished us with four cases of blindness only. Its importance is destined to increase very much in the course of trench warfare relatively to the bullet which was mainly responsible for blindness particularly during the advance and retreat of the troops. The grenade projected by the trench mortar produces contusions, perforations, and especially burns.

7. The State should occupy itself quite specially with those blinded by war. They should be urged to apply themselves to work suitable for the blind. Schools of instruction and of professional education should be created, as has already been done, especially at Lyons.

SYDNEY STEPHENSON.

NOTES AND ECHOES.

Deaths.

By the death of George Coats, at the early age of thirty-nine years ophthalmology has sustained a grievous loss. It has been given to few indeed to accomplish so much original and scientific work in so short a span of years. Death took place on November 2nd, at a nursing home in Edinburgh, after an abdominal operation performed by one of the most skilful and capable surgeons in Scotland.

THE LATE GEORGE COATS.

George Coats was born at Paisley, on March 5th, 1876. His professional education was obtained at the Universities of Glasgow and Vienna. He took the degrees of M.B., Ch.B. at the Glasgow University in 1897, and graduated Doctor of Medicine in 1901. After holding various resident appointments in Glasgow, including one at the Eye Infirmary, Coats devoted his entire attention to eye work. In 1902 he came to London, and began to work at the Royal London Ophthalmic Hospital (Moorfields), and was elected a member of the Ophthalmological Society. In the following year he took the diploma of Fellow of the Royal College of Surgeons, England. In 1902 he was appointed pathologist and curator of the Museum at Moorfields, and four years later assistant surgeon to the Hospital. This was followed by his election in [illegible] as assistant ophthalmic surgeon to St. Mary's Hospital, London, leading him to occupy the post of ophthalmic surgeon to the Hospital for Sick Children, Great Ormond Street, and to the Great Northern Central Hospital. In 1914 he was appointed full surgeon to Moorfields.

Coats' work in scientific ophthalmology was recognised the world over. He devoted special attention to the vascular affections of the retina, as well as to the comparative anatomy and pathology of the eye. His best known communication dealt with "Forms of Retinal Disease with Massive Exudation," and was published in the *Moorfields Hospital Reports* in November, 1908. In that paper he differentiated from a crowd of vascular affections, a disease which he called "Retinitis Exudativa," the existence of which is now recognised everywhere. In a later communication published in von Graefe's *Archiv f. Ophthalmologie* in 1912, Coats expanded his description of the disease, for which he proposed the alternative name "Retinitis Hæmorrhagica externa." Coats was a generous contributor to the columns of THE OPHTHALMOSCOPE.

The seal of professional approval was set upon Coats' work in 1910, when he was nominated as Hunterian Professor at the Royal College of Surgeons of England, taking as the subject of his lectures "Congenital Abnormalities of the Eye." A further token was given in the year 1912, when the Edward Nettleship Medal and Prize of the Ophthalmological Society were awarded to Coats.

At the moment of his untimely death Coats was secretary of the Ophthalmological Society, surgeon to Moorfields, and assistant ophthalmic surgeon to St. Mary's Hospital, London.

The following is from the pen of Mr. Leslie Paton, Coats' senior colleague at St. Mary's Hospital, London:

"It is a sad task to sit down and write one's memories of a friend who has recently died. It is sadder when it is a friend with whom for years one has worked side by side in intimate association. Every day that passes brings some incident which re-provokes the sense of loss. George Coats was my colleague at St. Mary's for nearly five years, and my friend since he came to London first in 1902. Quiet and unassuming, it was the intrinsic value of his work which gained for him the recognition which his abilities deserved. Some measure of the loss his death has caused to British ophthalmology can be formed when we remember that the bulk of the work he has done has appeared since 1904. He might reasonably have expected many years of work, and we who knew him know that it would never have fallen from the high level which this early work showed. But 'comes the blind fury with abhorred shears and slits the thin-spun life.' The ill-health of the last few years has been a sore handicap to him, and there is little doubt that the motive which impelled him to undergo the serious operation which cost him his life, was the desire to be freed from this curse of semi-invalidism. Amongst his intimate friends, Coats was one of the cheeriest of companions. His chief recreation was music, to which he was devoted. On holiday he spent most of his time sailing, and he knew the Clyde Lochs intimately. But he was nowhere happier than when working in the Museum at Moorfields, and to most of us the work he has done there will be his most lasting memorial."

The following appreciation has been contributed by an intimate friend, Dr. A. J. Ballantyne, of Glasgow :

Readers of THE OPHTHALMOSCOPE will have learned with profound regret of the untimely death of George Coats, who passed away on 2nd November, in a nursing home in Edinburgh, where, a few days earlier, he had undergone an abdominal operation.

George Coats was born in Paisley in 1876, being the fourth son of Mr. Allan Coats, and nephew of Dr. Joseph Coats, first professor of pathology in the University of Glasgow, and of the Rev. Dr. Jervis Coats, principal of the Baptist Theological College. After completing his education in the Paisley Grammar School, he proceeded to Glasgow University, where he graduated M.B., Ch.B. in 1897. The following two or three years were occupied with resident appointments in the Royal, Western, and Eye Infirmaries of Glasgow, and, having graduated M.D. in the autumn of 1901, he proceeded to Vienna with the object of pursuing a course of post-graduate study in ophthalmology. The visit was a short but strenuous one. The best courses that Vienna could offer were laid under contribution, and every day was a full day. But in his zest for work he did not forget that he was seeking a *liberal* education, and the occasional excursions into the surrounding country, the explorations of the museums and galleries, and, above all, the frequent visits to the grand opera, were entered into with the keenest enjoyment. He set out for home in March, 1902. Had changes then occurring in the staff of the Glasgow Eye Infirmary offered him the prospect of a footing there, his return would have been hastened, but no such opening offered itself, and he decided on a leisurely cycling tour in the direction of home. There was a pause of two weeks at Munich, and then followed briefer visits to the eye clinics of Freiburg, Zürich, Heidelberg, and Bonn. Thus the happy days of the *Wanderjahr* came to an end, and plans for the future had to be considered. Several provincial centres suggested themselves to him as possible places of settlement, but the attactions of London overbore all others, and he took up his residence there in the summer of 1902. He immediately threw himself heart and soul into the clinical and pathological work of Moorfields, at the same time working hard at the somewhat uncongenial task of preparation for the F.R.C.S., which was attained without mishap at the end of 1903. It was a period of unremitting toil, during which, as ever, he found recreation in literature and music—the latter often in the form of wrestlings on the flute with the *Leit-motife* of "Tristan" and the "Ring" in the seclusion of his rooms.

Practice was naturally of slow growth, and no doubt he had his times of depression, but his natural buoyancy of spirit and his enthusiasm for his chosen work, saved him from all doubts as to the wisdom of his London venture. Once a footing had been gained on the Moorfields staff, promotion was rapid, and he was overjoyed when, in 1909, he attained to the coveted rank of assistant surgeon ; but the success which brought him the greatest and most lasting gratification was his appointment in 1905 to the curatorship, his "beloved curatorship," which brought him unlimited scope for the work he found most congenial. He held, too, for a time, the positions of ophthalmic surgeon to out-patients at the Great Northern Central Hospital, and ophthalmic surgeon to the Hospital for Sick Children, Great Ormond Street ; and at the time of his death he was assistant ophthalmic surgeon to St. Mary's Hospital. He was a Hunterian Professor at the Royal College of Surgeons of England, in 1910.

Many must have passed through experiences such as he met with in the earlier years of self-discipline and hard work which were to give him a footing on the ladder of success, but the great adventure was never undertaken with more zest than he brought to his task, and the story was never told with such vivacity and humour as in his letters to those who watched from a distance the unfolding of his career.

He did not live to reap in consulting practice the full reward of his labours, but in the field of ocular pathology he had already won for himself a world-wide reputation. The volume of his published work is astonishing for one so young, and many of his papers, such as those on congenital anomalies and on exudative retinitis, are already classics in the literature of ophthalmology. The reward of the Nettleship Prize and Medal for his researches was as well earned as it was gratifying to him.

In personal characteristics Coats was a Scotsman of the best type, eager in his search for knowledge, tenacious in the pursuit of his ambitions, simple in habits, and of a straightfowardness and sincerity that were beyond reproach. He was frankly critical of his own work and of the work of others, but his judgment was never biased by personal considerations. He had a catholic, but critical and discriminating, taste in literature, art, and music, and he possessed a rich vein of humour which was absolutely without bitterness. Neither hard work nor increasing responsibilities ever dulled his amiability of temper or damped his exuberance of spirit, but there can be little doubt that within recent years his enjoyment of life, both in his work and in the occupations of his leisure, was to some extent overcast by the symptoms of ill-health which led him to seek relief at the hands of the surgeon.

What his death means to British ophthalmology is told in his accomplished work and the promise it gave for the future. To his friends the passing of such a friend is an unspeakable loss.

The deaths of the following American ophthalmologists are announced by the *Ophthalmic Record:* G. F. M. Lamont, Newark, N.Y., aged 42 years; David Hunt, Boston, aged 70 years; and Stuart W. Smith, Denison, Tex., aged 64 years.

* * * *

The late Angus NcNab

ANGUS MCNAB, who was foully murdered by the Germans in France, on November 1st, 1914, has left property valued at £9,242. It will be remembered that at Messines, McNab, although himself wounded, was binding up the wounds of two men of the London Scottish regiment, when the Germans bayonetted both the doctor and his patients.

* * * *

Professor Fuchs.

PROFESSOR ERNST FUCHS has been succeeded in the chair of ophthalmology in the University of Vienna by Professor S. Bernheimer, of Innsbruck.

THE OPHTHALMOSCOPE DIARY.

	1915.	
Midland Ophthalmological Society.	[illegible]. 7th	Eye Hospital, Birmingham
	1916.	
Royal Society of Medicine: Section on Ophthalmology	Feb. 2nd	1, Wimpole Street, W.
Ophthalmological Society of the United Kingdom.	May 4th, 5th & 6th	London.
American Ophthalmological Society.	May 9th & 10th	Washington, D.C.
Royal Society of Medicine: Section on Ophthalmology	June 14th	1, Wimpole Street W.
Oxford Ophthalmological Congress.	July 13th, & 14th	Keble College, Oxford.

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